



**UNIVERSITY OF CALICUT**

**Abstract**

Faculty of Engineering-B.Arch programme-Revised regulation , Curriculum and syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission-Implemented subject to ratification by the Academic Council - Orders issued.

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**G & A - IV - E**

U.O.No. 20254/2022/Admn

Dated, Calicut University.P.O, 27.10.2022

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- Read:-*1. Item No.1 of the Minutes of the meeting of the Board of Studies in Architecture held on 01.10.2022.  
2. Email dtd:22.10.2022 received from the Dean, Faculty of Engineering.  
3. Orders of Vice Chancellor in the file even no dated:25.10.2022.

**ORDER**

1. As per paper read as (1), the Board of Studies in Architecture discussed and scrutinised the B.Arch course Regulation 2022 in detail and approved the same with modifications. The Board also approved the Curriculum and Syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission.
2. The above resolution of the Board of Study in Architecture was approved by the Dean, Faculty of Engineering vide paper read as (2).
3. Considering the urgency in implementation of the Revised Regulations, Curriculum and the Syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission, sanction has been accorded by the Vice Chancellor on 25.10.2022 to implement the Revised Regulations, Curriculum and the Syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission subject to ratification by the Academic Council.
4. The Revised Regulations, Curriculum and the Syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission is therefore implemented, subject to ratification by the Academic Council.
5. Orders are issued accordingly. (Regulation and syllabus appended)

Ajitha P.P

Joint Registrar

To

1. The Principals of affiliated Architecture Colleges.
2. The Controller of Examinations, Pareeksha Bhavan.
3. The Deputy Registrar, B.Tech Branch Pareeksha Bhavan.

Copy to:PS to VC/PA to PVC/PA to Registrar/PA to CE/DR,B.Tech/GA

IF/Enquiry/SF/DF/FC

Forwarded / By Order

Section Officer

**University of Calicut**

**Regulations**

**of**

**B.Arch. Degree Course**

**(With effect from 2022 admissions)**

## **PREAMBLE**

These regulations may be called the University of Calicut (hereafter, the University, unless otherwise specified) Academic Regulations for B. Arch. 2022 Scheme. Architectural education in India is regulated by the Council of Architecture (hereafter, the COA, unless otherwise specified) which was constituted under the Architect's Act 1972. The CoA prescribes the mandatory minimum standards of Architectural Education regulations from time to time under the provisions of the Architects Act. It prescribes the structure of the B. Arch. Course, eligibility for admission of students, conduct of examinations etc. The regulations of B. Arch. Degree course (2022 Scheme) of the University have been formulated based on the COA (Minimum standards of Architectural Education) Regulations, 2020. These regulations shall be applicable for students admitted for the B. Arch. Course under the University from 2022 onwards.

The University has the right to modify the regulations from time to time. In all matters related to the regulations, the decision of the University and its interpretation given by the Academic Council shall be final and binding.

### **1. ADMISSION**

Admission policy, eligibility for admission and admission procedure shall be decided by the University and the competent statutory authority for admissions from time to time. The amendments in qualifications/eligibility criteria for admission as notified by the COA from time to time shall also be applicable for the admission to B. Arch Degree Course.

All Admissions to B.Arch. degree course shall be subject to passing of National Aptitude Test in Architecture (NATA) conducted by the COA (as per the guidelines of COA, India) or any specially designed aptitude test in architecture conducted by the competent authority of the Central/State Governments as approved by the COA from time to time.

For admissions for the B. Arch course, 50% weightage shall be given to the aptitude test and 50% weightage to the qualifying examination.

There is no provision for lateral admission to the second year or at any stage for the 5-year degree course in Architecture (B. Arch.).

A candidate who has a diploma in architecture/engineering awarded by the State Board of Technical Examination or an examination recognized equivalent by the State Board of Technical Education with Mathematics as a compulsory subject after undergoing regular course of 3 years in an approved institute, securing at least 50% aggregate marks, shall be eligible to be admitted to the first year B.Arch. Programme of the University.

Candidates with International Baccalaureate Diploma, after 10 years of schooling, with not less than 50% marks in aggregate and with Mathematics as a compulsory subject of examination are also eligible.



Diploma holders from other states shall produce an Equivalence certificate from the Controller of Technical Exams, Kerala/State Board of Technical Examinations for admission to B. Arch. Course.

A relaxation of 5% marks in the qualifying examination shall be allowed to those candidates who belong to the communities listed under the Socially and Educationally Backward Classes (SEBC) and whose annual family income is up to the specified limit. SC/ST candidates need only a pass in the qualifying examination.

Criteria for selection and method of admission to merit/management seats for B. Arch. Degree course conducted by Government/Aided/Self-financing colleges affiliated to the University shall be governed by the rules/regulations framed by the Commissioner of Entrance Examinations or other competent authority appointed by the Government of Kerala, in consultation with the University and without contravening with the stipulation of the University Grants Commission (UGC) and the COA. The students admitted by affiliated colleges violating the above regulations will not be eligible for registration to University Examinations and contravention of the regulations shall lead to withdrawal/suspension of affiliation. They shall also satisfy the conditions regarding age and physical fitness as prescribed by the University.

## **2. STRUCTURE OF THE COURSE**

The B.Arch. Degree Course will have a curriculum in conformity with the minimum standards of Architectural Education prescribed by the COA, constituted under the Architect's Act 1972, with syllabi consisting of theory, theory cum studio and studio subjects that shall be categorized as follows:

- a. **Professional Core (PC) Courses:** These are subjects to be compulsorily studied by the student as core requirement. Studio based design skill development subjects like Basic Design, Architectural Design, Architectural Thesis etc. come under this category.
- b. **Building Science and applied Engineering (BS & AE) Courses:** Courses that inform the professional core courses and should be studied compulsorily. Subjects like Building Construction, Mechanics, Building Services etc. come under this category.
- c. **Elective Course:** Courses that can be chosen from a pool of courses.
- d. **Professional Ability enhancement courses (PE):** These include courses like Project Management, Professional practice, Practical Training etc.
- e. **Skill Enhancement Courses (SE):** These are courses like, Computer aided design, Building Information modeling etc.

All students shall choose two elective subjects; one each in the eighth and ninth semesters from a set of elective subjects prescribed in the syllabus and offered by the institution. There should be at least 25% students of the class/batch for an elective subject to be offered.

New electives may be introduced according to the needs of emerging fields in architecture. The name of the elective and its syllabus should be approved by the University before the subject is offered as an elective.

The subjects of study, both theory and practical, shall be in accordance with the prescribed scheme and syllabi.

The medium of instruction, examination, and evaluation is English for all courses, design studios, seminar presentations and project/thesis reports.

### **3. DURATION OF THE COURSE**

The course for the B. Arch. Degree shall extend over a period of five academic years comprising of ten semesters including one semester of Practical Training after the completion of the 6th semester and one semester of Architectural Thesis Project work after the completion of the 9th semester. The maximum duration permissible for taking the B. Arch. Degree course is fixed as 10 years.

Admission to the first year shall be completed by 31st August or as specified by the COA. The first and second semesters shall be combined and the S1 & S2 B. Arch. Examination shall be conducted at the end of the first academic year.

The minimum number of working days in combined first and second semesters shall be 150 days. In the 3rd to 10th semesters, there shall be a minimum of 75 working days. Working periods can be of 50-60-minute duration. A Working week shall consist of minimum 30 periods.

### **4. COURSE CALENDAR**

The course calendar shall be prepared by the University in advance in the month of May by convening a meeting of Principals/Heads of all affiliated architecture institutions before the commencement of an academic year.

The course calendar, published by the University, shall be strictly followed for ensuring timely conduct of examinations and publication of results.

### **5. ASSESSMENT OF STUDENTS**

Assessment of students for each subject shall be done by internal continuous assessment and end semester examinations. The individual maximum marks allotted for continuous assessment and End-semester University examinations for each subject shall be as prescribed in the scheme and syllabus.

Every teacher is required to maintain an 'ATTENDANCE AND ASSESSMENT

RECORD' for every semester which consists of attendance marked in each theory / theory cum studio /studio class, the assessment marks and the record of class work (topics covered), separately for each course handled by the teacher. This should be submitted to the Head of the Department periodically (at least three times in a semester) for checking the syllabus coverage and the records of assessment marks and attendance. The Head of the Department shall affix his/her signature and date after due verification. At the end of the semester, the record shall be verified by the Head of the Department who shall keep this document in safe custody (for ten years from the date of admission of that batch of students). The records of attendance and assessment of both current and previous semesters should be available for inspection.

#### **a. CONTINUOUS ASSESSMENT (C. A.)**

Internal continuous assessment shall be conducted throughout the semester. It shall be based on internal examinations, assignments (such as home assignments, problem solving, group discussions, quiz, literature study and case studies, seminar presentations, term-project, software exercises, etc.) as decided by the faculty handling the course with the approval of the head of the institution, and regularity in the class.

Internal assessment marks of all theory and studio-based courses should have a class average limited to 80%. If the class average of internal assessment marks of any theory /studio-based course is greater than 80%, it should be normalized to limit it to 80%. If the class average is not greater than 80%, absolute marks should be given.

All the students in the nominal roll of the class on the closing day of semester should be considered for normalization of internal marks.

Normalized internal assessment marks of theory and studio-based subjects, should be published in the college 10 days before sending it to the University to enable the students to report any corrections.

All courses of the B.Arch. Degree Course are grouped into five categories. Continuous assessment marks shall be awarded as per the following norms for each group.

#### **GROUP I - Studio Based Courses like Basic Design & Architectural Design**

- Design exercises, projects, tests and internal reviews - 90% Marks
- Attendance - 10% Marks

Course plan with details of evaluation criteria and weightage of marks (scheme of assessment) shall be issued to the students in the beginning of the course. A brief of exercises/projects, number of reviews, tests, essential field study etc. shall be included in the course plan.

## **GROUP II - Theory cum Studio / Drawing Courses**

- Tutorials / Assignments / Viva based on assignments - 60% Marks
- Two internal tests each of equal weightage - 30% Marks
- Attendance - 10% Marks

Architectural Drawing and Graphics, Building Materials and Construction, Visual Art & Aesthetics, etc. come under this group. Course plan with assignment details and weightage of marks for each assignment (scheme of assessment) shall be issued to the students in the beginning of the course.

## **GROUP III - Theory Courses**

- Tutorials / Assignments (minimum 2) - 40% Marks
- Two internal tests each of equal weightage - 50% Marks
- Attendance - 10% Marks

## **GROUP IV - Workshops / Labs / Working Drawing (Internal evaluation courses)**

- Demonstrations / Presentations / Drawings (Course work) - 50% Marks
- Records / Portfolio - 20% Marks
- Final test / Viva - 20%
- Attendance - 10%

## **GROUP V - Practical Training, Dissertation, Thesis and Viva Voce**

C.A. for Practical Training, Dissertation, Thesis and Viva Voce shall be conducted as per the guidelines given in Section 24 (B. Arch. Degree Course manual).

The C.A. marks allotted for regularity for all courses shall be awarded full only if the candidates have secured at least 90% attendance in the subject. Proportionate reduction shall be made in the case of subjects in which he/she gets below 90% of the attendance for the subject.

The C.A. marks obtained by the student for all subjects in a semester are to be published in the College within 10 days after the last working day of the semester.

## **b. END-SEMESTER EXAMINATIONS**

There shall be University Examinations at the end of combined first and second semester and at the end of every semester from the 3rd semester onwards except the 7<sup>th</sup> semester (Practical Training) for Group II and Group III courses as prescribed under the respective scheme of examinations for B.Arch. Degree course.

Jury evaluation for Group I courses, Practical Training, Dissertation and Thesis Viva Voce shall be conducted by the University.

Panel of Jurors for Group 1 subjects, should have minimum 5 years' experience as per COA norms and shall be sent to the University 15 days before the closure of semester. Jury evaluation of Group 1 courses shall be conducted by the Institution with the Panel approved from university within 10 days after the last working day of the semester. The mark list should be sent to the University within 10 days of the Jury evaluation. Make up Jury marks shall be sent within one month from the date of regular Jury evaluation.

Students who are not eligible for condonation shall not be permitted to attend the Jury evaluation.

Examinations will be held twice in a year – May/June session (for even semesters) and November/December session (for odd semesters); failed or improvement candidates shall have to appear for the End-Semester examinations along with regular students. The combined 1st and 2nd semester is reckoned as equivalent to an even semester for the purpose of conduct of examination and the University examination shall be held during the May/June session. However, 9th and 10th Semester examinations shall be conducted in both the sessions.

## **6. ATTENDANCE**

A candidate shall be permitted to appear for the end-semester examinations only if he/she satisfies the following requirements:

- a. He/she must secure not less than 75% attendance in the total number of working hours in each semester.
- b. He/she must earn a progress certificate from the head of the institution stating that he/she has satisfactorily completed the course of study prescribed in the semester as required by these regulations.

It shall be open to the Vice Chancellor to grant condonation of shortage of attendance on the recommendation of the head of the institution in accordance with the following norms.

- The shortage shall not be more than 10%.
- Shortage up to 20% shall be condoned once during the entire course provided such shortage is caused by continuous absence on genuine medical grounds.
- Shortage shall not be condoned more than twice during the entire course.



A candidate who is not eligible for condonation of shortage of attendance shall repeat the semester.

Students are eligible for duty leave if they perform certain kinds of duties like representing the college/University in sports and games, etc. on recommendation from faculty members concerned, Head of Institution shall sanction duty leave for the period of absence. The maximum limit of duty leave that can be granted to a student during a semester is 10% of the total number of instructional hours engaged in that semester. Application for duty leave should be submitted to the Head of Institution preferably before the duty is performed or within ten working days after returning from duty. If duty leave is sanctioned, the student shall meet the faculty members handling classes for him/her in that semester (within 2 weeks after returning from duty), and request them to mark duty leave granted in the record of attendance.

## **7. PATTERN OF QUESTIONS FOR END-SEMESTER EXAMINATIONS OF THEORY SUBJECTS**

The question papers of end-semester examinations of theory courses shall be prepared by experts having at least 2 years of experience of teaching the concerned subject for B.Arch.

The question papers shall conform to the following guidelines:

- a. Even distribution of questions from all modules of the course syllabus as per the question paper pattern given in the syllabus of each subject.
- b. Unambiguous and free from any defects/errors.
- c. Contains adequate data/other information on the problems assigned.
- d. Have clear and complete instructions to the candidates like the structural and other codes allowed to be taken inside the examination hall, and special stationery items to be supplied to students if any.

The pattern of questions for all subjects shall be specified along with the syllabus of the subject.

The question papers shall be scrutinized by an expert on the subject to check the conformity to the guidelines.

Model question paper shall be prepared for each subject along with the syllabus preparation. This same model question paper along with the syllabus shall be sent to the question-paper setter every time for framing the questions. All question paper setters shall provide the scheme and key for the evaluation of the answer sheets of the course. The model question paper shall be made available to students.

## **8. EXAMINATION MONITORING CELL**

Head of each Institution should formulate an Examination Monitoring Cell

at the institution for supervising all examinations, including the internal examinations. This cell, with a senior staff member as Convener, shall consist of minimum three members (one shall be a lady). A clerical staff having computer skills shall also be assigned for the examination monitoring cell.

The collective responsibilities of the examination monitoring cell are to:

- a. Officiate as the examination squad to keep a vigil on all end-semester examinations. If any malpractices are found/reported by invigilators, inform these to the Head of Institution along with a report about the incident. Head of Institution shall forward all such complaints to the University.
- b. In case of malpractices found during the end-semester University examinations, the Chief Superintendent shall initiate actions according to the latest University Order related to Malpractice.
- c. To receive any complaint from students regarding issues like out-of-syllabus questions, printing mistakes, etc. of end-semester examinations of theory courses. The cell shall investigate these complaints and if necessary, forward it to the University with specific comments
- d. Schedule all examinations conducted as part of internal assessment of students.
- e. To receive any complaints from students regarding internal examinations, inquire into such incidents, and give a report to the Head of the Institution for necessary action.
- f. In general, to function as an extended wing of the office of the Controller of Examinations of the University, at Institution level.

To conduct all the theory examinations, a Chief Superintendent and an Assistant Chief Superintendent should be appointed internally by the Head of the Institution. At least one external Additional Chief Superintendent should be appointed by the University as Observer for conducting theory examinations in all affiliated Architecture Colleges, who shall be not below the rank of an Assistant Professor in a Government/Aided College or Assistant Registrar in the University.

## **9. CENTRAL VALUATION CAMP**

At the end of every semester, the Head of each Institution should forward the list of faculty members working in the college along with their qualification, years of teaching experience, and subjects taught in various semesters to the University. This is a mandatory requirement which shall be strictly followed by the Head of each Institution.

Faculty members appointed for Centralized Valuation Camp should necessarily have minimum two years teaching experience or as prescribed by the University and COA from time to time. The Head of each Institution shall ensure the availability of sufficient number of regular faculty members having experience and qualifications in the

institution.

Appointment of faculty from architectural institutions under the University for valuation camp shall be based on the intake of students of the institution.

Faculty members from affiliated architecture colleges who are assigned duty by the University for Centralized Valuation Camp should strictly attend the valuation at the specified center. Head of each institution should ensure this, failing which disciplinary action shall be initiated against defaulting colleges, including withholding of results of candidates of such institutions.

Duty leave shall be granted to such faculty members who are assigned valuation duties.

### **10. MINIMUM FOR PASS**

Candidates shall secure not less than 40% of marks in the External/Final jury and 50% aggregate in Continuous assessment and External /Final Jury put together for a pass in **Group I & Group V** courses.

For **Group II and Group III** courses,

- a. A candidate who secures not less than 40% marks in a course at the end- semester examination and not less than 50% of the total marks assigned to the course, shall be declared to have passed the examination in that course.

OR

- b. A candidate who secures end semester examination itself, 40% of the total marks assigned to a subject, shall also be declared to have passed the examination in that course.

The total marks assigned to a course in the above calculations are the sum of maximum marks assigned to the end-semester examination and maximum internal assessment marks of that course. Candidates shall be assigned grades according to the marks scored.

For **group IV** courses which do not have University examination, the minimum marks for pass shall be 50% of the aggregate marks.

### **10.1. MAKE UP CHANCE**

If a student fails to secure a pass in examinations of Group I, Group IV and Group V subjects except Thesis in Tenth Semester, the student shall be given a make -up-chance. In all such cases make-up Jury evaluation marks will be limited to 50% (both internal and external marks).

#### **Group I subjects:**



If a student fails to secure a pass in examinations of Group 1 subject, the student shall be given a make-up chance. Such students shall improve their internals by working under the supervision of a faculty member assigned by the Head of the department, report to the college on daily basis.

Maximum period for submission of improved works shall not exceed three weeks from the date of announcement of the results of the concerned students in the Regular Jury examination, by the Head of the teaching institution, excluding intervening University examinations, if any.

Only those students, who have appeared for the original chance, shall be eligible for make-up chance. Exemption shall be provided for absence in regular jury evaluation if the student fails to appear(absent) for the Jury due to genuine medical reasons and have submitted portfolio on the date announced by the department. Such students can attend Make up Jury with the permission from Head of the teaching institution.

Maximum marks for make-up Jury evaluation will be limited to 50% for both internal (C.A.) and external (Jury) marks.

In case, a student fails to secure a pass in this make-up chance, the student shall have to take a break and repeat the subject/s when it is offered next. i.e. as a repeater student in the subsequent batch, shall fulfill the requirements for attendance, i.e. minimum 75% attendance for that particular subject, secure fresh internal assessment marks attending all the design stage reviews and submit the design/assignments as in the case of a regular student.

#### **Group IV subjects:**

If a student fails to secure a pass in examinations of Group IV courses, the student shall be given a make-up chance. He/she shall improve the works done under the supervision of a faculty member assigned by the Head of the department. Faculty member shall revise the internal marks of the subject based on the performance of the student. The internal marks secured in the makeup chance shall be limited to 50%.

In case, a student fails to secure a pass in this make-up chance, the student shall be promoted to the next semester. However, he/she must repeat that course in the subsequent chance, secure fresh internal assessment marks and submit the assignments/improved portfolio.

#### **Group V subjects:**

**Practical Training:** Makeup chance shall be given to those who fail in the jury of practical training . They shall submit the improved portfolio of works within three weeks from the date of announcement of the results in the department and attend the makeup Jury on the scheduled date. Other conditions for eligibility and evaluation for makeup Jury are the same as those mentioned for Group I subjects.

In case, a student fails to secure a pass in this makeup chance, the student shall have to take a break and repeat the practical training when it is offered next i.e. as a repeater student in the subsequent batch.

**Dissertation:** If a student fails in the dissertation and in the subsequent make up jury evaluation, he/she shall be promoted to the next semester and shall have to repeat the course in the subsequent batch as a repeater student, secure fresh internal assessment marks and attend the Jury evaluation as in the case of a regular student.

In case of Thesis & Viva Voce refer to the B. Arch Degree Course manual. (Section 24.4)

## **11. IMPROVEMENT OF END SEMESTER EXAMINATION**

Candidates shall be allowed to improve the grade of any two courses of Group II & Group III by repeating the University Examination in each semester in the subsequent chance only. If the candidate gets more marks in the improvement chance, marks scored in the improvement chance will be considered for grading in the subject; otherwise, marks scored in the first attempt will be retained.

No candidate shall be permitted to improve the marks scored in subjects of Group I courses and Continuous Assessment unless otherwise described in these regulations.

## **12. IMPROVEMENT OF CONTINUOUS ASSESSMENT MARKS**

Students who are unable to pass in Group II or Group III subjects due to low internal marks shall be permitted to improve their internal marks after the completion of their tenth semester with special permission from the Head of the Institution. There shall be only one chance for improving internal marks for each subject. Students shall not be permitted to avail this chance after two years of completion of their tenth semester.

Students who wish to improve the internal marks shall register for the subject at the University after getting approval from the institution. Internal marks of subjects of odd semester shall be improved during the odd semester session and those of even semester shall be improved during the even semester session.

Head of the department shall appoint a faculty for each subject. Students shall meet the concerned faculty once in every month for the subject during the semester. Students shall attend internal tests scheduled by the Institute and submit all the assignments given to them by the concerned faculty. The revised internal marks should be limited to 60% in Group II subjects and 70% in Group III subjects.

Copy of the internal marks should be sent to the University within 6 months from the date of registration. In case the student has scored more than 40% marks in multiple attempts of the university examinations, the highest marks among them shall be considered for

calculating the aggregate marks.

### **13. CREDIT SYSTEM**

Each course shall have a certain number of credits assigned to it depending upon the academic load (hours/week assigned to it) and the nature and importance of the subject. The credit associated with each subject will be shown in the prescribed scheme and syllabi. Each course shall have an integer number of credits, which reflects its weightage.

### **14. GRADING**

The university shall award the letter grade to students based on the marks secured by them in both internal assessment and end-semester examination taken together for the courses registered. Each letter grade indicates a qualitative assessment of the student's performance and is associated with a specified number of grade points. The grading system along with the grade points for each grade, applicable to passed candidates is shown below. All passed candidate shall be allotted a grade S, A, B, C, D, or E according to the total marks scored by him/her. Absolute Marks secured by the candidates shall also be included in the Mark list.

If a candidate does not pass a subject as per the conditions given in Section 10, he/she shall be assigned an Unsatisfactory grade 'U' irrespective of his/her total marks. If a student does not pass a subject in two attempts, the maximum grade he/she can get is 'C' when he/she passes the subject in any subsequent examination, whatever be the marks scored by him/her.

A student is considered to have completed a course successfully and earned the credits if he/she secures a letter grade other than 'U' in that course. Letter grade 'U' (Failed) has zero grade point and the candidate has to write the examination again to improve the grade. A student's performance is measured by the number of credits that he/she has earned and by the cumulative grade point average (CGPA) maintained by him/her.

Percentage of marks (rounded off to the nearest integer) scored by the passed candidates.	Corresponding Grade allotted	Grade Points
90% and above	S	10
80% and above but less than 90%	A	9
70% and above but less than 80%	B	8
60% and above but less	C	7

than 70%		
50% and above but less than 60%	D	6
40% and above but less than 50%	E	5

For converting CGPA to percentage of marks, the following formula can be used. Percentage marks = (CGPA - 0.5) x 10.

### 15. SEMESTER GRADE POINT AVERAGE (SGPA) AND CUMULATIVE GRADE POINT AVERAGE (CGPA)

- a. A Semester Grade Point Average (SGPA) shall be computed for all the students for each semester, as follows:

$$SGPA = \sum_{i=1}^n \frac{C_i G_i}{C_i}$$

where, n is the number of subjects registered during the semester,  $C_i$  is the number of credits allotted to the subject as per the scheme, and  $G_i$  is the grade points corresponding to the grade awarded to the student for the subject.

- b. A Cumulative Grade Point Average (CGPA) shall be computed for all the students at the end of each semester by taking into consideration their performance in the present and the past semesters as follows:

$$CGPA = \sum_{i=1}^m \frac{C_i G_i}{C_i}$$

where, m is the number of courses registered up to that semester,  $C_i$  is the number of credits allotted to the subject as per the scheme, and  $G_i$  is the grade points corresponding to the grade awarded to the student for the subject.

An up-to-date assessment of overall performance of a student is obtained by calculating CGPA. CGPA is weighted average of the grade points obtained in all the subjects registered by the students since he entered the B. Arch. course.

- c. Both the SGPA and CGPA shall be rounded off to the second place of decimal and recorded as such for ease of presentation. Whenever the CGPAs are to be used for the purpose of determining the merit ranking in a group of students, only the rounded off values shall be made use of.



## 16. REGISTRATION FOR EACH SEMESTER

Every eligible candidate should register for all subjects of the end-semester examinations of each semester. A candidate who does not register will not be permitted to attend the end semester examinations; he/she shall not be permitted to attend the next semester.

A candidate shall be eligible to register for any higher semester i.e. 3rd semester onwards if he/she has satisfactorily completed the course of study and registered for the examination of the combined first and second semesters. A candidate shall be eligible to register for the fourth to tenth semesters if he/she has satisfactorily completed the course of study and registered for the examination of the immediate previous semester. He/she should register for the semester at the start of the semester before the stipulated date. University will notify the starting and closing dates for each semester.

Minimum Cumulative Credit requirements for gaining eligibility to register for the next higher semester is as follows:

<b>Semester</b>	<b>Allotted Credits</b>	<b>Cumulative Credits</b>	<b>Minimum Cumulative Credits required</b>	<b>Other Prerequisites</b>
First & second	58	58	Not Applicable	Not Applicable
Third	29	87	Not Insisted	Must Pass S1&S2 Basic Design
Fourth	29	116	Not Insisted	Must Pass S3 Architectural Design - I
Fifth	29	145	Not Insisted	Must Pass S4 Architectural Design - II
Sixth	29	174	Not Insisted	Must Pass S5 Architectural Design - III
Seventh	20	194	64 Credits from S1 to S4	Must Pass S6 Architectural Design - IV
Eighth	29	223	Not Insisted	Must Pass Practical Training
Ninth	27	250	96 Credits form S1 to S6	Must Pass S8 Architectural Design - V
Tenth	20	270	Not Insisted	Must Pass S9 Architectural Design - VI

A student who fails to fulfil the eligibility criteria to register to the next higher semester, must take a break and can be permitted to register with the subsequent batch as and when he/she satisfies the eligibility condition as a repeater in addition to the existing student strength of that

batch.

As this rule for promotion is an academic prerequisite, no exemption should be granted for any reason whatsoever. The Head of the Institution should take necessary measures to implement this rule strictly.

A Student who has temporarily discontinued his/her studies shall be permitted to rejoin the course with permission from the University, on the recommendations of the Head of the Institution, if he/she had to discontinue the course based on medical grounds. He/she shall produce a medical certificate issued by a Govt. medical officer specialized in the respective field while rejoining the course. There will be provision for maternity leave to female students as per the norms of the University in vogue.

### **17. INTER - COLLEGE TRANSFER WITHIN THE UNIVERSITY**

A student can be transferred from one institution to another institution only in the beginning of 3rd semester of the course, after the completion of admission process. Such inter college transfer is applicable

- Only for regular B. Arch. Students enrolled through Government Quota.
- The transfer shall be permitted just before the commencement of third semester.
- The transfer shall be only within the sanctioned strength (intake) of the receiving college.
- The candidate shall fulfil the academic eligibility requirement for promotion to the third semester.
- Transfer shall be permitted:
  - o Between Govt/Govt. Aided Colleges
  - o Between Self-Financing Colleges
- If the number of applicants is more than the vacant seats available, the transfer may be based on the Entrance Exam Rank.
- The student shall opt for only one college for inter college transfer.
- The college transfer once approved by the receiving college shall be final and binding on the applicant. No student shall be permitted, under any circumstances, to refuse the change of college once offered.

Notification inviting application for inter college transfer shall be issued by the University just before the commencement of the third semester.

### **18. ELIGIBILITY FOR THE DEGREE**

- a. No candidate shall be eligible for the B. Arch. Degree unless he/she has undergone the prescribed course of study for a period of not less

than five academic years (including Practical Training and Architectural Thesis Project) in an institution maintained by or affiliated to the University and has passed all the examinations as per the prescribed B. Arch. Degree curriculum within 10 years of registering to the first year of B. Arch program as mentioned in rule no. 3.

- b. The University shall issue the mark lists of students who pass the examinations in supplementary chances, through the head of the institution in which the student attended the course work.

## **19. ADDITIONAL REQUIREMENTS FOR THE DEGREE**

In addition to the requirements prescribed for the award of B. Arch. Degree, each student must complete compulsory social service for a specified duration during 3rd to 9th semesters of the course. A record is to be kept showing the details of social service activities undertaken and it should be approved and certified by the Head of Institution before permitting the student to register for the tenth semester.

Social work shall have Social/Architectural significance. This can be a project related to INTACH, Rural/Urban Housing, Urban/Rural, Social/Physical surveys, Environmental issues and any such project the Head of the Institution approves. The report is to be made available in the college library for reference to concerned persons in a suitable format.

Students are required to compulsorily undertake educational tours to visit places of architectural interest and other study trips as per the requirements of the Architectural Design Studio in the relevant semesters, taking not more than 5 working days in a semester. It can be combined with vacations/holidays.

For students who are granted exemption from attending any tour, measures shall be taken to record their attendance in the college and provide alternate tasks.

Students are also required to participate in a Documentation camp before the end of the Seventh semester.

## **20. CLASSIFICATION OF SUCCESSFUL CANDIDATES**

- a. A candidate who qualifies for the degree, passing all the subjects of the ten semesters within 6 academic years after the commencement of his course of study and secures not less than a CGPA of 8.00 of all the semesters shall be declared to have passed the B. Arch. Degree examination in First Class with Distinction.
- b. A candidate who qualifies for the degree, passing all the subjects of the ten semesters within 6 academic years after the commencement of his course of study and secures less than 8.0 CGPA but not less than a CGPA of 6.50 of all the semesters shall be declared to have passed the B. Arch. Degree examination in First Class.
- c. All other candidates who qualify for the degree passing all the subjects

of the ten semesters and not covered as per Section 19 (a) and 19 (b) shall be declared to have passed the B. Arch. Degree examination in Second class.

## **21. CLASS COMMITTEE**

The Head of the Institution shall take necessary steps to form a class committee for each class at the start of classes of each semester. This class committee shall be in existence for the semester concerned. The class committee shall consist of the Head of Department, Staff Advisor of the class, a senior faculty member of the department, and three student representatives (one of them should be a girl). There should be at least two meetings of the class committee every semester; it shall be the responsibility of the Head of Department to convene these meetings. The decisions of the Class Committee shall be recorded in a register for further reference. Each class committee will communicate its recommendations to the Head of Institution.

The responsibilities of the class committee are:

- a. to review periodically the progress and conduct of students in the class.
- b. to discuss any problems concerning any subjects in the semester concerned.
- c. to identify weaker students of the class and suggest remedial measures.
- d. to review teaching effectiveness and coverage of syllabus.
- e. discuss any other issue related to the students of the class.

## **22. GRIEVANCE REDRESSAL CELL**

Each college should set up a Grievance Redressal Cell constituted as per the norms prescribed by MHRD, UGC, COA, State Government, Honorable Courts etc. to look into grievances of the students, pertaining to SC & ST welfare, women, examinations etc.

## **23. ANTI-RAGGING CELL**

The Head of Institution shall take necessary steps to constitute anti-ragging committee and squad at the commencement of each academic year. The committee and the squad shall take effective steps as specified by the Honorable Supreme Court of India, to prevent ragging.

## **24. B. ARCH. DEGREE COURSE MANUAL**

More details about the conduct and evaluation of Basic Design and Architectural Design I to VI, Practical Training, Thesis and Viva Voce, Study Tour and Documentation Camp for Architectural Design, and Dissertation are discussed in this course manual.

### **24.1. BASIC DESIGN AND ARCHITECTURAL DESIGN I TO VI**



- a. The Evaluation of Basic Design and Architectural Design I to VI is based on Continuous Evaluation and End-Semester Jury Evaluation conducted by a panel of Jury members. The marks for the Continuous Assessment shall be awarded by the faculty member in charge.

The University shall appoint the Jury panel for the Jury Evaluation. The Evaluation panel shall consist of an External Examiner and an Internal Examiner (with minimum 2 years teaching experience) who shall be appointed by the University on the recommendations of the Chairman of the B.Arch. Program.

The External Examiner shall be from among the faculty members of other teaching Institutions or a Practicing Architect registered with the COA, incorporated under Architect's Act 1972, having experience of not less than 5 years.

Improvement/ Make-up jury, whenever required shall be conducted by the same panel, as far as possible or alternate arrangement shall be made by the Chairman of Board of Examinations

- b. Students shall submit the portfolio consisting of the assignments/design projects for the course and other documents as instructed by the subject-in-charge before 3.00 pm on the date scheduled by the College prior to the commencement of the Jury Evaluation to be eligible for the Jury. All assignments/sheets/works shall be sealed (college seal) and signed by the subject-in-charge. Assignments/sheets/works without the college seal, date and signatures of the subject-in-charge shall not be evaluated by the Jury Panel.
- c. The Jury members (Internal and External Examiners together) shall evaluate the portfolio. Students shall be present and explain their work to the Jury members at the time of evaluating their portfolio.
- d. The Candidate shall fulfil the conditions of Section 10 to pass group I courses.
- e. The C.A. marks of the students must be published at least one week prior to the External Jury Evaluation.
- f. The Jury members shall submit the consolidated marks counter signed by the Chairman of Board of Examinations to the University.
- g. The result status as passed/failed/absent of the students shall

be published by the Head of the Institution within three working days from the last day of the Jury examination, to facilitate them to appear for the make-up chance.

## **24.2. PRACTICAL TRAINING**

### **a. Introduction**

As per the B. Arch. Curriculum, all students shall undergo one semester of practical training immediately after the completion of the 6th semester B.Arch. examinations. Only those who have passed all studio-oriented subjects (group I courses) up to sixth semester shall be eligible to undergo practical training. In such a case where results have not been declared the candidate shall be given provisional enrollment in Practical Training.

The training shall be under an Architect registered with the COA, possessing an experience of minimum five years, and approved by the Dept. of Architecture of the teaching institution.

The duration of practical training shall be one semester (Min. 100 working days/as per COA norms).

### **b. Selection of Firm for Practical Training.**

The candidate shall select the Architect/Firm for practical training with the approval of the Dept. of Architecture of the teaching institution, in advance before the commencement of the 6th semester University examination.

He/she should not be a faculty of the Dept. of Architecture of the teaching Institution or their immediate relatives or an Architect employed in the Public sector.

Students can also select internationally recognized Architects practicing outside India, with the approval of the Dept. of Architecture of the teaching Institution.

### **c. Type of works to be carried out during the training period**

The students are expected to gain exposure in the following aspects:

- Site visit and Site Supervision
- Preparation of drawings for getting building permissions, working drawings, service drawings, etc.
- Preparation of estimates, specifications, contract documents, and tender documents
- Discussion with clients and other consultants

### **d. Monthly work report**

The students are required to send copies of the monthly report of the work done to the Dept. of Architecture of the teaching institution, within one week after the completion of each month. The report shall be duly signed by the Principal Architect or by the concerned Architect supervising the work.

**e. Documents to be submitted after the completion of training**

The students are required to submit to the Department of Architecture of the teaching institution a report including the details of their work illustrated with sketches, prints and other documents connected with the projects on which he/she has worked both in office and at site, a work diary, originals of monthly reports, and a certificate regarding their conduct and performance of work done during the training period. This report shall be certified by the registered Architect under whom the candidate had undergone practical training.

**f. Evaluation of Practical Training**

Continuous assessment for Practical Training shall be done by the institution in a systematic procedure. For the Practical Training, a viva-voce examination shall be conducted at the end of the seventh semester by a Jury consisting of an internal examiner and an external examiner appointed by the University.

The efforts of students to gain experience and their regularity in conforming to the prescribed norms shall be given more weightage than the quantity of sheets produced during their evaluation.

Makeup chance shall be given to those who fail in the jury of practical training as mentioned in section 10.1. In case, a student fails to secure a pass in this makeup chance, the student shall have to take a break and repeat the practical training when it is offered next i.e. as a repeater student in the subsequent batch in addition to the existing student strength of that batch.

**24.3. DISSERTATION**

Students of the B.Arch. Degree course are required to submit a Dissertation as part of the ninth semester. Students admitted to the ninth semester shall submit choices of their dissertation within a week after the commencement of the ninth semester classes.

The Head of the Department of the teaching institution shall allot a Dissertation Guide (Faculty member of the Dept. of Architecture of the teaching institution) for each student

considering the nature of the topic and specialization of the faculty member. Students shall obtain approval for the topic of the Dissertation from the Department of the teaching Institution.

Continuous assessment for Dissertation shall be done for a weightage of 50% of the total marks by the Evaluation Board (Constituting of project guide and 2 other faculty members of the same Institution) who will award marks for three assessments as per the academic schedule of the University. For Dissertation, a Viva Voce Examination shall be conducted at the end of the semester. The head of Dept. of the teaching institution shall constitute a Jury for evaluating the final presentation of the dissertation work. The Jury panel shall be constituted from among the faculty of the Dept. of Architecture of the Teaching institution and/or from among the Architects registered with the Council of Architecture, incorporated under the Architect's Act 1972, with not less than 5 years' experience.

#### **24.4. THESIS AND VIVA VOCE**

##### **a. Selecting the Thesis topic**

Students of the B.Arch. Degree course are required to complete an Architectural Design Thesis during the last six months of the B.Arch. Degree Program.

Students shall submit choices of their thesis project one month before the commencement of the tenth semester classes.

The Head of the Department of the teaching institution shall allot a guide for each student considering the nature of the work and specialization of the faculty member. Students shall obtain approval for the project of Thesis from the Architecture Department of the Teaching Institution. The duration of the thesis shall be 18 weeks from the date of commencement of the tenth semester of B.Arch. Degree Course.

The project selected may be either a live architectural project or a hypothetical one so that the student gets training in tackling projects similar to what he/she is likely to face in his/her professional career. The project and its programming shall be worked out by the student in consultation with the guide.

The work should include an intensive study of the topography, climate and problems concerned with design of spaces and structures. The solution of the problem shall incorporate the integrated approach of the architect, engineer, urban designer, planner, and landscape architect and this shall be reflected in the preparation of drawings and written report.



Students are required to maintain a work diary of the thesis work. All students are required to schedule their thesis work and get it approved by the guide at the beginning of the thesis work. A copy of the schedule shall be submitted to the thesis coordinator nominated by the Head of the Department.

#### **b. Internal Evaluation**

Internal evaluation of each student shall be done by a three-member jury constituted by the Department. Jury members shall constitute of either faculty of Architecture of the Teaching College and/or from among the Architects registered with the Council of Architecture, incorporated under the Architect's Act 1972, with not less than five years' experience. Guide shall be mandatorily a member of the Jury. The progress shall be assessed by the jury periodically through a minimum of four stages of reviews, the dates of which shall be published by the department before the commencement of the tenth semester. Each review shall assess the student's systematic design process and solutions expressed by graphical (including models) and oral presentation.

A total of 300 internal assessment marks shall be awarded based on four reviews. The split-up marks of the same shall be as follows.

**Review 1** - Introduction of the Thesis Topic, Feasibility studies, Basic data, Case studies/ Primary surveys, Analysis, Arriving at Inferences and Design Program, Site analysis and Conceptual development, Introduction of Special Topic.

**90 marks**

**Review 2** - Review of Previous stage, arriving at lay out plan, Sketch design for various building blocks including Floor Plans, Sections, Elevations, Views, Block Models etc., Conformity to Relevant Standards, Bye laws etc. and Achievement of Basic Objectives of Architectural Design, Further studies on Special Topic.

**90 marks**

**Review 3** - Review of Previous stages, Final Layout, Final Design for various building blocks through relevant Plans, Sections, Elevations, Views etc., Details of Building and Site Services, Site Planning and Landscape schemes, Preparation of relevant Detailed Drawings, Application of Special Topic in the design scheme, Preparation of Draft Report.

**90  
marks**

**Review 4** - Review of Final stage of all finalized drawings and schemes, Structural Details, Working Details etc., Review of Final Draft of the Report.

**30  
marks**

A candidate who fails to secure minimum 40% marks in each review shall have to appear for a supplementary review on the date announced by the department of Architecture. There shall be only one supplementary review for each stage. The maximum marks awarded in the supplementary review of each stage shall be limited to 50%.

Students have to obtain a total of 40% marks combining the four stages of reviews to be eligible for the external jury, failing which he/she has to repeat the Thesis with the next immediate batch.

Such students will have to take a token registration from the University to continue their Thesis along with the next regular batch. These students shall be considered as supplementary candidates in addition to the existing strength of the class.

**c. External evaluation**

The University shall appoint the Jury panel for the Jury examinations. The Jury panel shall consist of one/two External Examiner(s) and Internal Examiners who are to be appointed by the University on the recommendations of the Chairman of the B.Arch. program. The external examiner shall be Architects registered with the Council of Architecture, incorporated under the Architect's Act 1972, with not less than 10 years' teaching/professional experience.

Students shall secure 40% of marks in the external jury and 50% aggregate (Internal+ External Jury) for successfully completing the Thesis and Viva voce.

The Jury appointed by the University shall evaluate the Thesis documents and conduct viva voce. Marks shall be jointly awarded by the Jury out of the maximum of 300 and the tabulated mark-list duly signed by the Internal and External Examiner shall be forwarded to the Controller of Examinations through the Chairperson of Board of Examinations.

**d. Suggested Areas for Special Topic**

- Building construction techniques and the details of the use of new materials
- Equipment and design of any one building service like air conditioning, electrification and illumination,

- sanitation and water supply or acoustics
  - Furnishings, fittings and finishes
  - Climatic research and its applications
- Or any other suitable topic approved by the teaching institution

**e. Documents to be submitted for the Jury**

Two copies of the Data Collection in the preliminary design stage (up to the design and including the case studies) shall be compiled and presented in A3 size format along with the final submission. Two copies of the Final Hard Bound Report shall be submitted before the final Jury on the date and time announced by the Dept. of Architecture of the Teaching Institution. The total number of design sheets for final submission shall not exceed 30 (thirty) A1 size sheets. Models are to be submitted at the time of Viva voce examination.

The format and other instructions regarding the schedule of reviews, preparation of the bound volumes of Data Collection, Final Report, Final Sheets, Physical Models, etc. shall be announced by the Dept. of Architecture of the Teaching Institution.

The Head of the Department shall have the freedom to send the Thesis documents after the final Jury evaluation for participating in competitions organized by the Council of Architecture etc., with the consent of the concerned candidate. Anything which is not explicitly covered in these regulations shall be decided by the Thesis monitoring committee.

**24.5. STUDY TOUR AND DOCUMENTATION CAMP FOR ARCHITECTURAL DESIGN**

**a. Study Tour**

The study tours for visiting important places of Architectural interest shall be conducted as part of Architectural Design and shall officially be accompanied by the faculty members. The maximum duration of one study tour shall be limited to 15 days combined with vacation, out of which working days shall not exceed 5 in a semester. Each student shall submit a detailed bound report of the educational tour to the Head of the Department within two weeks after the programme. These bound reports signed by the staff advisor or faculty in charge of tours/visits and by the Head of the Department, shall also be considered for evaluations as part of the Architectural Design Jury.

**b. Documentation Camp**

The documentation camp shall be of maximum 7 days

duration and conducted as part of the Architectural Design course before the end of the sixth semester. The faculty members handling the subject shall also be present in the camp. The documentation camp consists of preparation of measured drawings of selected buildings / historic places inside and around the state of Kerala.

The originals of materials produced as part of the study tour and camp shall be submitted to the Head of the Department and such materials submitted shall be the property of the Department. These drawings/reports shall be signed by the staff advisor or faculty in charge of the Architectural Design Studio and by the Head of Department. They shall also be considered for evaluation as part of the Architectural Design Jury.

***Notwithstanding all that has been stated above, the University has the right to modify any of the above regulations from time to time as per the University rules and the COA regulations.***



**University of Calicut**

**Curriculum**

**of**

**B.Arch. Degree Course**

**(With effect from 2022 admissions)**

## B. ARCH. CURRICULUM, 2022

Every course of B. Arch Program is categorized as shown in the table:

Course Category		
No	Category	Code
1	Professional Core	PC
2	Building Science and applied Engineering	BS & AE
3	Elective Course	EC
4	Professional Ability Enhancement Courses	PE
5	Skill Enhancement Course.	SE

Additionally, there are five subject groups as shown in the table:

Subject Groups	
Group No	Name
I	Studio Based Courses like Basic Design & Architectural Design
II	Theory cum Studio / Drawing Courses
III	Theory Courses
IV	Workshops / Labs / Working Drawing
V	Practical Training, Dissertation, Thesis and Viva Voce

COMBINED FIRST AND SECOND SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-11	Basic Design*	I	PC	16	0	1	7	0		200	300	500
AR 22-12	Theory Of Architecture	III	PC	4	2	0	0	3	100		50	150
AR 22-13	Building Materials & Construction -I	II	BS & AE	6	1	0	2	3	100		100	200
AR 22-14	Theory Of Structures-I	III	BS & AE	6	2	1	0	3	100		50	150
AR 22-15	History of Architecture-I	III	PC	4	2	0	0	3	100		50	150
AR 22-16	Architectural Drawing & Graphics	II	PC	8	2	0	2	3	100		100	200
AR 22-17	Visual Art & Aesthetics	IV	PC	6	1	0	2	3	100		100	200
AR 22-18	Model Making & Carpentry	IV	SE	4	0	0	2	0			100	100
AR 22-19	Digital Arts & Graphics	IV	SE	4	0	0	2	0			100	100
<b>TOTAL</b>				<b>58</b>	10	2	17		600	200	950	1750

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

### Note:

One Hour Tutorial of Basic Design to be dedicated for improving the Communication & Presentation Skills of the students.

THIRD SEMESTER							
Course	Subject	Group	Category	Credits	Hours Per Week	Duration	Marks

Code					**			of Exam				
					L	T	P/S		W	J	C.A.	Total
AR 22-31	Architectural Design-I *	I	PC	10	0	1	9	0		200	300	500
AR 22-32	Building Climatology	III	PC	3	3	0	0	3	100		50	150
AR 22-33	Building Materials & Construction -II	II	BS & AE	4	2	0	2	3	100		100	200
AR 22-34	Theory Of Structures-II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-35	History of Architecture-II	III	PC	3	3	0	0	3	100		50	150
AR 22-36	Building Services-I (Water Supply & Sanitation)	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-37	Computer Aided Visualization - I	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>29</b>	<b>12</b>	<b>3</b>	<b>14</b>		<b>500</b>	<b>200</b>	<b>700</b>	<b>1400</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

Two Hour Tutorial of Climatology to be dedicated for conducting experiments in Building Science lab.

FOURTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-41	Architectural Design-II *	I	PC	10	0	1	9	0		200	300	500
AR 22-42	Site Analysis & Planning	I	PC	3	2	1	0	3	100		50	150
AR 22-43	Building Materials & Construction -III	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-44	Theory Of Structures-III	III	PC	3	3	0	0	3	100		50	150
AR 22-45	History of Architecture-III	III	BS & AE	3	3	0	0	3	100		50	150
AR 22-46	Building Services-II (Lighting & Electrical Services)	I	PC	3	2	1	0	3	100		50	150
AR 22-47	Computer Aided Visualization - II	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>28</b>	<b>12</b>	<b>4</b>	<b>12</b>		<b>500</b>	<b>200</b>	<b>650</b>	<b>1350</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* Two hours per week allotted to Library

**Note:**

One Hour Practical time of Site Analysis and Surveying to be earmarked for survey practical.

One Hour Studio time of Building Services to be dedicated in teaching the application of Building Services in the previous year design problem.

FIFTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-51	Architectural Design-III *	I	PC	10	0	1	9	0		200	300	500
AR 22-52	Landscape Design & Planning	III	PC	4	3	0	1	3	100		50	150
AR 22-53	Building Materials & Construction -IV	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-54	Design Of Structures-I	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-55	History of Architecture-IV	III	PC	3	3	0	0	3	100		50	150
AR 22-56	Building Services-III (HVAC & Mechanical Services)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-57	Specification & Cost Estimation	III	PC	3	1	2	0	3	100		50	150
<b>TOTAL</b>				<b>29</b>	13	4	12		600	200	650	1450

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Practical time of Building Services to be earmarked for conducting experiments in building science laboratory.

SIXTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-61	Architectural	I	PC	10	0	1	9	0		200	300	500

	Design-IV *											
AR 22-62	Interior Design	II	EC	4	1	0	3	3	100		100	200
AR 22-63	Building Materials & Construction -V	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-64	Design Of Structures-II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-65	History of Architecture-V	III	PC	3	3	0	0	3	100		50	150
AR 22-66	Building Services-IV (Acoustics & Fire Fighting)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-67	Working Drawing	IV	PC	3	0	0	3	3			100	100
<b>TOTAL</b>				<b>29</b>	10	2	17		500	200	750	1450

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Studio time of Building Services to be dedicated to applying knowledge to a design problem.

SEVENTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-71	Practical Training *	V	PE	20	N.A.			0		300	300	600
<b>TOTAL</b>				<b>20</b>	0	0	0		0	300	300	600

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

EIGHTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-81	Architectural Design-V *	I	PC	12	0	1	11	0		200	300	500



AR 22-82	Urban Design	III	PC	3	3	0	0	3	100		50	150
AR 22-83	Elective-I	III	EC	3	3	0	0	3	100		50	150
AR 22-84	Building Economics & Sociology	III	PC	3	3	0	0	3	100		50	150
AR 22-85	Research Methodology	III	PC	3	3	0	0	3	100		50	150
AR 22-86	Environment Science in Architecture	III	PC	3	3	0	0	3	100		50	150
AR 22-87	Building Information Modelling	IV	EC	2	0	0	2				100	100
<b>TOTAL</b>				<b>29</b>	<b>15</b>	<b>1</b>	<b>13</b>		<b>500</b>	<b>200</b>	<b>650</b>	<b>1350</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Studio time of Building Services to be dedicated to apply knowledge to a design problem.

**Elective I**

- AR 22-86-1 Barrier Free Architecture
- AR 22-86-2 Graphic and Product Design
- AR 22-86-3 Computational Design in Architecture
- AR 22-86-4 Sustainable Cities and Communities
- AR 22-86-5 Cost-effective Architecture
- AR 22-86-6 Road Safety and Civic Sense

NINTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-91	Architectural Design-VI *	I	PC	12	0	1	11	0		200	300	500

AR 22-92	Human Settlement Planning	III	PC	3	3	0	0	3	100		50	150
AR 22-93	Construction & Project Management	III	PE	3	3	0	0	3	100		50	150
AR 22-94	Professional Practice	III	PE	3	3	0	0	3	100		50	150
AR 22-95	Elective-II	III	EC	3	3	0	0	3	100		50	150
AR 22-96	Dissertation	V	PE	3	0	3	0	3		100	100	200
<b>TOTAL</b>				<b>27</b>	<b>12</b>	<b>4</b>	<b>11</b>		<b>400</b>	<b>300</b>	<b>600</b>	<b>1300</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\*3 hours shall be allotted to Library/ Pre-Thesis Discussions

### Elective II

AR 22-96-1 Disaster Mitigation and Management

AR 22-96-2 Green Buildings and Rating systems

AR 22-96-3 Architectural Conservation

AR 22-96-4 Building Performance and Compliance

AR 22-96-5 Services in High rise Building

TENTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-101	Thesis *	V	PC	20	N.A.			0		300	300	600
<b>TOTAL</b>				<b>20</b>	N.A.			0		300	300	600

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

SEMESTER WISE CREDIT DISTRIBUTION										
Semester	1&2	3	4	5	6	7	8	9	10	Total
Credits	58	29	28	29	29	20	29	27	20	<b>269</b>

**University of Calicut**

**Syllabus**

**of**

**Combined First and Second Semester**

**B.Arch. Degree Course**

**(With effect from 2022 admissions)**



CURRICULUM OF COMBINED FIRST AND SECOND SEMESTER B. ARCH.												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-11	Basic Design*	I	PC	16	0	1	7	0		200	300	500
AR 22-12	Theory Of Architecture	III	PC	4	2	0	0	3	100		50	150
AR 22-13	Building Materials & Construction -I	II	BS & AE	6	1	0	2	3	100		100	200
AR 22-14	Theory Of Structures-I	III	BS & AE	6	2	1	0	3	100		50	150
AR 22-15	History of Architecture-I	III	PC	4	2	0	0	3	100		50	150
AR 22-16	Architectural Drawing & Graphics	II	PC	8	2	0	2	3	100		100	200
AR 22-17	Visual Art & Aesthetics	II	PC	6	1	0	2	3	100		100	200
AR 22-18	Model Making & Carpentry	IV	SE	4	0	0	2	0			100	100
AR 22-19	Digital Arts & Graphics	IV	SE	4	0	0	2	0			100	100
<b>TOTAL</b>				<b>58</b>	10	2	17		600	200	950	1750

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Tutorial of Basic Design to be dedicated for improving the Communication & Presentation Skills of the students.

**Semester: First and Second (Combined)**

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-11	BASIC DESIGN	0-1-7	16	2022
<p><b>Course Objectives</b></p> <p>The Basic Design for students of architecture would,</p> <ul style="list-style-type: none"> <li>• Introduce the various elements and principles of design for two and three-dimensional compositions.</li> <li>• Train the various stages of graphical representations and communications used in drawing and design through a series of exercises</li> <li>• Inculcate the ability to translate abstract principles of design into architectural solutions for simple problems</li> </ul>				
<p><b>Course Outcome</b></p> <ul style="list-style-type: none"> <li>• To observe deeply, compare, and analyze the development of different forms.</li> <li>• To explore fundamental concepts of proportion, scale, anthropometry, geometry, circulation, spatial expression</li> <li>• To understand and interpret the elements and principles of design</li> <li>• To use drawings and physical models as a tool to conceive, organize and develop habitable, three-dimensional space</li> <li>• To get acquainted with attributes of spatial qualities</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• Anthony di Mari and Nora Yoo – ‘Operative Design: A Catalog of Spatial Verbs’, 2013</li> <li>• Anthony di Mari - ‘Conditional Design: An Introduction to Elemental Architecture’, 2014</li> <li>• Arthur L. Guphill and Susan E. Meyer, 'Rendering in Pen and Ink , Watson-Guphill, 1997</li> <li>• Francis D.K.Ching - Architecture - Form Space and Order, Van Nostrand Reinhold Co., (Canada),1979.</li> <li>• Francis D.K.Ching – Drawing – A creative Process, Van Nostrand Reinhold Co., (Canada),1979</li> <li>• Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.</li> <li>• Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975 • Maitland Graves,The Art of Colour and Design, McGraw Hill Book Company Inc.,1951</li> <li>• Mark Karhen, Space planning basics, John Wiley &amp; son - 2004</li> <li>• Neuferts' Architects' Data.</li> <li>• Owen Cappelman &amp; Michael Jack Kordan, Foundations in Architecture: An Annotated Anthology of beginning design projects, Van Nostrand Reinhold, New York.</li> <li>• Paul Laseau, Graphic Thinking For Architects and Designers, John Wiley &amp; Sons, New York, 2001. Page 29 of 163</li> <li>• Paul Zelanski &amp; Mary Pat Fisher, Design Principles &amp; Problems, 2nd Ed, Thomson &amp; Wadsworth, USA,1996</li> <li>• Robert Gill, Rendering with Pen and Ink</li> <li>• Simon Unwin, ‘Analyzing Architecture’, Routledge, 2003</li> <li>• Simon Unwin. ‘Exercises in Architecture-Learning to Think as an Architect’, Routledge, 2013</li> <li>• V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt.Ltd., New Delhi,1973.</li> <li>• Wong Wucius, Principles of color composition, Van Nostrand Rein Hold – 1976</li> </ul>				

- Wang Wucius, , Principles of three-dimensional design, Van Nostrand Rein Hold – 1976
- Wang Wucius, Principles of Two-dimensional design, Van Nostrand Rein hold -1972

### **MODULE I (48 hours)**

#### **INTRODUCTION TO DESIGN FUNDAMENTALS**

Elements in composition: Point, Line, Plane, Volume, Colour, Texture. Analysing paintings, compositions, murals, sculptures, buildings, and nature. Introduction to and exploration of Principles of design – Dominance, unity, balance, symmetry, hierarchy, rhythm, contrast, harmony, focus etc. Introduction to fundamentals in drawing, composition and understanding graphic medium: Basic exercises in drawing skill building, composition, and design vocabulary.

### **MODULE II (24 hours)**

#### **COMPOSITIONAL OPERATIONS AND EXPLORATIVE MODELING**

Exercises in 2 D and 3 D using concepts like abstraction, transformation, Illusion, and symbolism. Exercises on observation and visual perception on the principles of Gestalt Theory Forms: Generation of 3 D volumes from 2D to explore various organizations of forms and principles involved in articulating forms. Study of Solids and voids. Study of linear, planar and curvilinear forms using materials like mount board, metal foil, mill boards, foam boards, wire string, wire mesh, fabric and clay.

### **MODULE III (32 hours)**

#### **SPATIAL QUALITIES**

Colour and texture: Study of colour and colour schemes, texture and texture scheme. Perception of Colour and texture in light from natural and artificial sources. Study of openings for light, shadow, shades and sciography and their effect on spaces'. Study of fluid and plastic forms using appropriate materials like clay, plaster of Paris etc. and explore the play of light and shade. Scale and proportion: Study of scale and proportioning systems – Classical orders, Golden Section etc. Anthropometrics – Study of space standards and anthropometrics to include the physically handicapped and the elderly. Literature and cinema as a medium to acquaint with architectural spaces.

### **MODULE IV (56 Hours)**

#### **DESIGN METHODOLOGIES**

Introduction to design methodologies focusing on conceptual design development and iterative design process involving simple functional- well-articulated spaces. Illustration through hand-drafted 2D drawings and models. Major Project: Designing simple activity spaces for a small user group considering climate, site conditions, and other user requirements. Design of a fundamental furniture layout, circulation, lighting and ventilation for spaces such as Exhibition Pavilion, Gazebo, Architect's offices, Doctor's clinic and the like with an emphasis on built-unbuilt relationships and transitional spaces. Minor Project: Detailing and designing of furniture used in the Design.

### **TOTAL HOURS: 160**

#### **CONTINUOUS INTERNAL EVALUATION PATTERN:**

Design exercises, projects, tests, and internal reviews: 270 Marks

Attendance: 30 Marks

<b>Semester: First and Second (Combined)</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-12</b>	<b>THEORY OF ARCHITECTURE</b>	<b>2-0-0</b>	<b>4</b>	<b>2022</b>
<p><b>Course Objectives</b></p> <ul style="list-style-type: none"> <li>To familiarize students with the development of architecture as a discipline</li> <li>To introduce vocabulary essential to analyse and experiment within architecture</li> <li>To understand philosophies, ideologies, and theories in architecture</li> </ul>				
<p><b>Course Outcome</b></p> <ul style="list-style-type: none"> <li>To understand the origins of architectural theory and its contribution to practice.</li> <li>To enhance faculty of thinking, observing, analysing, communication and discourse</li> <li>To offer support to develop own frameworks for appreciating architecture</li> <li>To appreciate the importance of design principles in analysing and interpreting architecture</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>Johnson, PA (1994), 'The Theory of Architecture: Concepts, Themes &amp; Practices', New York: John Wiley &amp; Sons.</li> <li>Broadbent, G (1973), 'Design in Architecture – Architecture and the human sciences', London: John Wiley and Sons</li> <li>Simon, U (1997), 'Analysing Architecture', London: Routledge</li> <li>Rasmussen, SE (1962), 'Experiencing Architecture', Boston: MIT Press</li> <li>Ching, D K (1997), 'Architecture: Form, Space and Order'</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>Tanizaki, J (2001), 'In praise of shadows', Vintage classic</li> <li>Bachelard, Gaston (2014), 'Poetics of Space', London: Penguin Classics.</li> <li>Eagleton, T (1990), 'The Ideology of the Aesthetic'. Basil Blackwell. Cambridge, MA.</li> <li>Harries, K (1996), 'The ethical function of Architecture', MIT Press. Cambridge, MA.</li> <li>Foucault, M (2004), 'The Order of Things: Archaeology of the Human Sciences', Routledge, New York.</li> <li>Jencks, C (1985), 'Modern Movements in Architecture', Anchor Press, USA.</li> <li>Nesbitt, K., 'Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995', Princeton Architectural Press, New York.</li> <li>Rowe, C (1982), 'The Mathematics of an Ideal Villa &amp; Other Essays', MIT Press, 1982.</li> <li>Agrest, DI (1991), 'Architecture from Without: Theoretical Framings for a Critical Practice', MIT Press, USA.</li> <li>Broadbent, G. Bunt, R &amp; Jencks, C (1980), 'Signs, Symbols &amp; Architecture', Wiley</li> </ul>				

**MODULE I (10 hours)****The essence of Architecture**

Nature of architecture. Part in relation to whole. The construct of Whole. Ordering Architecture – principles of composition. Form and space in architecture. Measure as fundamental engagement, geometry, scale, proportion. Built form, spatial relationships, spatial configuration, and organization.

**MODULE II (20 hours)****Architecture and approaches**

Design conceptualisation. Influencing factors: climate, society and culture, technology, politics, economy etc. with relevant examples. Relevance of structure and stability. Material and Construction. Archetypes and approaches – Pragmatic, Canonical, Analogic, Iconic and Futuristic.

**MODULE III (20 hours)****Creative thinking and Architecture Profession**

Vertical and lateral thinking in architecture. Creative thinking in architecture. Principles, abstractions, and dictums. Positions adopted by architects in society and in practice – Architect as visionary, architects as artists, architects as poets, Architects as scientists and technologists through relevant examples from India and abroad

**MODULE IV (10 hours)****Theoretical positions**

Architectural historicism. Context and contextualism. Type and typology. Determinism. Form and function. Isms – Minimalism, regionalism, parametricism, modernism, postmodernism, etc. Aphorisms – Less is more, Less is bore, Form follows Function etc. Genius Loci

TOTAL HOURS: 60

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.

Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.



<b>Semester: First and Second (Combined)</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-13</b>	<b>BUILDING MATERIALS AND CONSTRUCTION I</b>	<b>1-0-2</b>	<b>6</b>	<b>2022</b>
<p><b>Course Objectives</b>  The building materials and construction course for students of architecture would,</p> <ul style="list-style-type: none"> <li>• Introduce the different components of buildings and various materials, their properties and uses.</li> <li>• Provide an exposure to the principles of masonry construction, arches, lintels/ beams, corbelling, cantilever etc.</li> <li>• Help them to understand the details of construction using stone and soil as well as products derived from them.</li> </ul>				
<p><b>Course Outcome</b></p> <ul style="list-style-type: none"> <li>• To understand the properties of various building materials and their applications.</li> <li>• To explain the techniques for constructing various components of a building.</li> <li>• To acquire drafting skills for the representation of construction details.</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>• Arora S.P. and Bindra S.P., "Text book of Building Construction", Dhanpat Rai &amp; Sons, New Delhi, 2012.</li> <li>• Klans Dukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.</li> <li>• National Building Code of India 2005- Part 6 Structural Design- Section 3 Timber and Bamboo.</li> <li>• Francis D.K. Ching, Building Construction Illustrated John Wiley &amp; Sons 2000.</li> <li>• Balagopal T.S. Prabhu, "Civil Engineering Drawing Hand book"</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• Ghanshyam Pandya, M.P. Ranjan, Nilam Iyer Bamboo and Cane Crafts of Northeast India; National Institute of Design (2004).</li> <li>• Don A. Watson Construction Materials and Processes McGraw Hill 1972.</li> <li>• WB Mckay Building construction, Vol 1,2, Longman UK 1981.</li> <li>• Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999</li> </ul>				

## **MODULE I**

### **INTRODUCTION (15 hrs)**

Introduction to Building Materials – Sand, Stone, Brick, Timber, Clay & Ceramic products – their sources, classification, properties, and applications. Drafting Exercises on Representation of different types of building materials in plan and sections. Symbols used to denote different types of joinery, plumbing fittings and accessories in plan, sections and elevations. Components of Building – Sub structure and Super structure. Drafting Exercises on Simple, cross section of walls showing various building components in plan and section.

## **MODULE II**

### **FOUNDATIONS (12 hrs.)**

Introduction to Foundations – Definition, function, types – selection criteria – bearing capacity of soil – methods of testing – settlement of foundations. Drafting exercises on various types of foundations – Wall Footing, Isolated Footing, and Combined Footing.

## **MODULE III**

### **MASONRY (30 hrs.)**

Brick Masonry - Types of bricks, principles of brick masonry construction - joints, pointing and finishing. Types of brick masonry - brick masonry work using different bonds, rat trap bond, Junctions – T- Junction (1 and 11/2 bricks), L – Junction (1 and 11/2 bricks), Cross junction (2 bricks), Piers – 1, 11/2, 2 bricks. Brick paving, Reinforced Brick Masonry, Cavity wall, and Composite Masonry. Types of mortar & mortar mix for brick construction and Plastering. Brick masonry for foundation plinth and wall, arches and lintels in brick, coping, steps. Principles of stone masonry construction Types of stone masonry random rubble masonry/ Ashlar Masonry - stone finishes- jointing types of mortar for stone construction. Stone masonry for foundation, plinth and wall, retaining wall, arches and lintels in stone, coping, steps, flooring, cladding.

## **MODULE IV**

### **MUD CONSTRUCTION, CLAY PRODUCTS AND RURAL MATERIALS (15 hrs.)**

Cob, Rammed earth, Wattle and daub construction Principles of Masonry construction using Adobe, Compressed Stabilized Earthen Blocks Foundation and plinth for mud structures, Design of openings (arches, corbelled arches), Mud plaster, mud mortar, Damp and weather proofing of mud structures, Mud flooring, Construction of thatched roof. Drafting Exercises on Hollow clay blocks – walls, roofs, partitions. Applications of various natural materials (Mud, Bamboo, Casuarinas, Palm, Coconut, Hay, Grass husk) in various parts of the building.

## **TOTAL HOURS-72**

### **CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments / Viva based on assignments	- 60 marks
Two internal tests each of equal weightage	- 30 marks
Attendance	- 10 marks

### **UNIVERSITY EXAMINATION PATTERN**

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any

one of them.

Q5 - 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

**Semester: First and Second (Combined)**

<b>Course No.</b>	<b>Course Name</b>	<b>L-T-S-P/D</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-14</b>	<b>THEORY OF STRUCTURES-I</b>	<b>2-1-0</b>	<b>6</b>	<b>2022</b>

**Course Objectives**

- To develop an overall understanding and interest in structural system.
- To apply the principles of mechanics in practical engineering problems.
- To enable an understanding of fundamentals of stress and strain.
- To introduce basic understanding of engineering structures and to explain effective forces on various structural elements.
- To study the sectional properties of various sections.

**Course Outcome**

- To explain the concepts of stress and strain.
- To Differentiate the various structural elements in a building and types of loads acting on it.
- To demonstrate the principles used in various types of beams and their loading patterns.
- To describe the sectional properties of various sections.



**Text books**

- Rajasekharan S. and Sankarasubramanian G., Engineering Mechanics- Statics and Dynamics, Vikas Publications, New Delhi
- R. K. Banzal., Engineering Mechanics, Lakshmi Publications Pvt. Ltd., New Delhi
- R. K. Banzal., Strength of Materials, Lakshmi Publications Pvt. Ltd., New Delhi
- Bhavikkatti S. S., Engineering Mechanics, New Age International Publishers
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt Limited

**Reference Books**

- Shames I. H, Engineering Mechanics- Statics and Dynamics, Prentice Hall of India, New Delhi
- Hibbeler R. C., Engineering Mechanics- Statics, Pearson Education, New Delhi
- Timoshenko, Strength of Materials Vol. I & Vol. II, CBS Publishers & Distributors, New Delhi
- James M Gere & Stephen P Timoshenko, Mechanics of Materials, CBS Publishers & Distributors, New Delhi
- S. B Junnarkar & H. J Shah, Mechanics of Structures Vol I, Charotar publishing House, Anand
- .Kumar, K. L., Engineering Mechanics, Tata Mc Graw Hill Publishing Company Limited.
- Benjamin J., Engineering Mechanics, Pentex Book Publishers and Distributors.
- J.L. Meriam & L.G. Kraige, "Engineering Mechanics", John Wiley and Sons

**MODULE I (18 hours)**

- Basic concepts of Strength, Stiffness and Stability.
- Introduction to force concepts: Characteristics of force, System of forces.
- Principles of statics- principle of transmissibility, composition and resolution of forces.
- Equilibrium conditions - free body diagrams.
- Resultant of co-planar concurrent forces –Parallelogram law of forces, Lami's theorem.
- Resultant of co planar non-concurrent forces- Method of resolution, Method of moments - Theorem of Varignon. Couple, Parallel force system.

**MODULE II (14 hours)**

- Simple stresses and strains - Types of direct stresses (Tension, compression and shear) and indirect stresses (Bending and Torsion).
- Elastic theory- stress strain diagram- Hooks Law- Working stress- Poisson's ratio.
- Elastic Constants- Relationship between elastic constants (Derivations not required)
- Elongation of bars of constant and varying cross sections (Concept only), Thermal stresses (Simple problems only)

**MODULE III (14 hours)**

- Beams: Types of beams and supports.
- Load types - Point load, uniformly distributed and varying loads.
- Support reactions of simply supported, cantilever and overhanging beams.
- Plane trusses: Types of trusses-Analysis of cantilever and simply supported trusses
- using Method of joints (Method of sections and Graphical method (Concept only)

**MODULE IV (14 hours)**

- Centre of gravity - Concept and Definition - Center of mass- Centroid - Determination of centroid of plane figures, composite and cut out sections.
- Moment of inertia - Concept and Definition - Perpendicular axis theorem, Parallel axis theorem - Moment of inertia of plane and composite areas (Rectangle, square, triangle, circle, I -section, Angle section) - Polar moment of inertia

**TOTAL HOURS: 60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

- Q I - 8 short type questions of 5marks, 2 from each module.  
 Q II - 2 Questions of 15marks from module I with choice to answer anyone.  
 Q III - 2 Questions of 15marks from module II with choice to answer anyone.  
 Q IV - 2 Questions of 15marks from module III with choice to answer anyone.  
 Q V - 2 Questions of 15marks from module IV with choice to answer anyone.

**Semester: First and Second (Combined)**

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR22-15	History of Architecture I	2-0-0	4	2022

**Course Objectives**

- To explain the concepts of culture, time and space through the lens of historic architecture.
- To provide an insight to the architecture of the prehistoric period, ancient civilizations across the world, and Buddhist and Hindu architecture in India.
- To introduce the cultural and contextual determinants that influenced the built form and settlement patterns through ages.
- To illustrate the development of architecture with reference to character, style, materials, technology, climate, geography, religion, and culture.

**Course Outcome**

- To demonstrate passionate observation and documentation to learn about heritage
- To explain the spatial and stylistic qualities associated with architecture of various civilizations.
- To analyze architecture within the realm of various social, political and economic upheavals, and as a response to cultural and contextual pressures.
- To appreciate the chronological developments along the timeline and across various



civilizations and geographies.

#### **Texts**

- Christopher Tadgell , 'The History of Architecture in India', Phaidon, 1994.
- Percy Brown, 'Indian Architecture (Buddhist and Hindu Period)', Taraporevala and Sons, Bombay, 1983.
- Satish Grover, 'The Architecture of India (Buddhist and Hindu Period)', Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
- Upinder Singh, 'A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century', Pearson Education India, 2008

#### **References**

- Banister Fletcher, 'Dan Cruickshank Sir, Banister Fletcher's a history of architecture: A History of Architecture', Architectural Press,1996.
- Ching, Francis, Vikramadithya Prakash, Mark M Jarzombek, 'A Global History of Architecture', John Wiley & Sons, 2011.
- Dora P. Crouch, June G. Johnson, 'Traditions in Architecture: Africa, America, Asia, and Oceania', OxfordUniversity,2000.
- Ilay Cooper, 'Barry Dawson, Traditional Buildings of India', Thames and Hudson, 1998. Satish Chandra, 'History of Architecture and Ancient Building Materials in India', Tech Books International,2003.
- James C. Harle , 'The Art and Architecture of the Indian Subcontinent:' Second Edition, Yale UniversityPress,1994.
- Michael Raeburn, 'Architecture of the Western World', Rizzoli, 1982.

**Module I (16 Hours)**

Introduction to the architecture of the ancient western world. To generate an understanding about the development of civilization and its architectural implications.

Prehistoric architecture of the West, East and Middle East: General characteristics of the earliest Human Settlements: Gobekli Tepe, Catal Huyuk, Jericho, Jomon culture.

Cross-cultural understanding of factors influencing early settlement and built form of Ancient Civilizations:

Ancient Mesopotamia: History, evolution and characteristics. Example: Ziggurat (Sumerian), Palace of Sargon (Assyrian), Ishtar Gate (Babylonian).

Ancient Egypt: History, evolution and characteristics. Example: Early tomb architecture and later temple architecture: Examples- Giza Pyramid Complex, Great Temple of Karnak.

Ancient Greece: History, evolution and characteristics. Study of principles of design, proportion, Optical corrections and Classical Orders. Example: Acropolis of Athens and structures within, Agora.

Ancient Rome: History, evolution and characteristics. Study of planning principles adopted, Tuscan and composite orders, Roman Engineering Skills- lintels, arches & vaults, Aqueducts, building typologies, Forum. Examples - Pantheon, Colosseum.

**Module II (8 Hours)**

Early Settlements in India: Mehrgarh, Early Harappan. Indus Valley Civilisation: City Planning. Domestic Architecture. Building materials and construction techniques. Example: Great Bath, Mohenjodaro

Vedic Period: Vedic Village. City Planning in the later Vedic period. Building materials and construction techniques.

Buddhist & Jain Period: History, evolution and characteristics. Major building typologies; Stupa, Chaitya hall, Vihara. Examples: The Great Stupa at Sanchi, Chaitya Hall at Karli, Main caves at Ajanta & Ellora.

**Module III (12 Hours)**

A brief overview of Hindu Architecture - Hindu Temple planning, essential features, philosophy and ritual creating specific architectural vocabulary – Early Hindu temple architecture and rock-cut architecture of the Gupta, Chalukyan and Pallava periods – Tigawa Temple, Main caves at Badami, Ladh Khan and Durga Temple, Aihole; Rathas of Mahabalipuram.

North Indian Temple Architecture (Nagara style)- Evolution and salient features of North Indian Temple Architecture and its regional variations in Orissa, Gujarat & Madhya Pradesh. Examples - Lingaraja Temple, Bhubaneswar; Sun Temple, Modhera; Khandariya Mahadeo temple, Khajuraho.

**Module IV (12 Hours)**

South Indian Temple Architecture (Dravida style) : Evolution under different rulers and characteristic features- Examples:- Pallavas: Shore Temple at Mahabalipuram; Chola: Brihadeshwara Temple, Thanjavur; Pandya : Evolution of Gopurams and temple towns- Meenakshi Temple, Madurai; Vijayanagara: Vittalashwami Temple, Hampi; Nayaks: Rameswaram Temple.

Central Indian Temple Architecture (Vesara style) – Evolution under different rules and characteristic features- Examples:- Chalukyas: Virupaksha Temple, Pattadakal; Rashtrakutas: Kailashnath Temple, Ellora; Hoysala: Hoysaleswara Temple, Halebid.

**TOTAL HOURS: 48**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

**Semester: First and Second (Combined)**

<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/D</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22-16</b>	<b>ARCHITECTURAL DRAWING &amp; GRAPHICS</b>	<b>2-0-2</b>	<b>8</b>	<b>2022</b>

**Course Objectives**

- To equip students with the fundamental basics of drawings, methods, mediums and techniques
- To enable students to visualize geometric objects and buildings in 2 and 3 Dimensions
- To develop appropriate manual skills for visualization and technical representation of built forms by means of different types of drawings.
- To bridge to higher semesters the application of skills in the design process, computer-aided design and presentation

**Course Outcome**

- To demonstrate the concepts of architectural graphics and drawing techniques
- To represent geometric objects, furniture or buildings using various architectural drawing methods
- To visualize and represent drawings with precision and quality

**Textbooks**

- N. D. Bhatt, 'Elementary Engineering'
- Giesecke, Mitchell, et.al, 'Engineering Graphics' (7th edition)
- Fraser Reekie, 'Reekie's Architectural Drawing'
- Ching, Francis D. K., 'Architectural Graphics'
- Ching, Francis D. K., 'Design Drawing'
- Ching, Francis D. K., 'Drawing, Space, Form, Expression'
- Shankar Mulik, 'Perspectives and Sciography', Allied Publishers, India, 1999
- Norling. Earnest R., 'Perspective Made Easy', New York: Dover Publications, Inc.,1999

**MODULE I (12 hours)**

1. INTRODUCTION TO DRAWING - Introduction to Architectural drawings: types of drawings- Freehand sketches and mechanical drawings for architectural applications. Different mediums used such as pencil, ink, papers, and reproduction methods—demonstration of drawing instruments and their use.

2. FREE-HAND DRAWING - Introduction to line weights, free-hand sketching

3. TECHNICAL DRAWING & TOOLS - Horizontal, vertical and diagonal lines (using 30<sup>o</sup>, 45<sup>o</sup>, and 60<sup>o</sup> set squares), construction of regular polygons, terminologies used in architectural drawing, and material representations in a drawing.

4. SHEET FORMATTING & DRAWING CONVENTIONS- Sheet layout, title block preparation, different types of lines, line thickness, dimensioning lines and dimensioning styles

5. LETTERING - Introduction to lettering, simple writing exercises

6. SCALES – Types of scales, Use of scale in drawings, Enlarging/reduction of drawings, Representation fraction (R.F.), Construction detail of Plain scale.

*(Minimum 4 Drawing Exercises Suggested)*

### **MODULE II (20 hours)**

INTRODUCTION TO SOLIDS & ORTHOGRAPHIC PROJECTION - Introduction

1. DEVELOPMENT OF SURFACE OF SOLIDS- (Frustum and truncated- prisms, cylinder, cone and pyramids)
2. ORTHOGRAPHIC PROJECTION OF SOLIDS (prisms, cylinder, cone and pyramids)
3. ORTHOGRAPHIC PROJECTION OF OBJECTS (simple objects and furniture)
4. MEASURED DRAWING- Drafting Plan, Elevations and Sections of single-room structures

*(Minimum 4 Drawing Exercises Suggested)*

### **MODULE III (20 hours)**

PARALLEL PROJECTIONS: Introduction

1. ISOMETRY- Projections and Views- Drawing isometric views and projections of simple solids and furniture pieces- Conversion from isometric 3D to orthographic 2D
2. AXONOMETRY - Axonometric drawing and exploded views of simple objects and documented spaces in the campus.

*(Minimum 4 Drawing Exercises Suggested)*

### **MODULE IV (16 Hours)**

PERSPECTIVE PROJECTION & SCIOGRAPHY: Introduction

1. PERSPECTIVE PROJECTIONS: Definition of perspective elements, Vanishing point Methods. Constructing one-point and two-point perspective views of simple solids and furniture pieces.
2. INTRODUCTION TO SCIOGRAPHY- principles of shades and shadows, drawing shadows of simple objects in plan, elevation and perspective.

*(Minimum 4 Drawing Exercises Suggested)*

#### **Note:**

The number of drawing exercises suggested above is for class work. Additional exercises wherever necessary may be given as home assignments.

**Total Hours: 68 Hours**



**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments / Viva based on assignments	- 60 marks
Two internal tests each of equal weightage	- 30 marks
Attendance	- 10 marks

**UNIVERSITY EXAMINATION PATTERN**

- Q I - 3 Questions of 12.5 marks each from module I with a choice to answer any two of them.
- Q II - 3 Questions of 12.5 marks each from module II with a choice to answer any two of them.
- Q III - 3 Questions of 12.5 marks each from module III with a choice to answer any two of them.
- Q IV - 3 Questions of 12.5 marks each from module IV with a choice to answer any two of them.

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**Semester: First and Second (Combined)**

<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/D</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22-17</b>	<b>VISUAL ART AND AESTHETICS</b>	<b>1-0-2</b>	<b>6</b>	<b>2022</b>
<p><b>Course Objectives</b></p> <ul style="list-style-type: none"> <li>• Holistic development of students by understanding the role and importance of art as a means of expression.</li> <li>• Present Art as a medium of collective engagement and giving aesthetical orientation among students.</li> <li>• Help students acquire basic knowledge in critical appraisal of various art forms.</li> <li>• Provide requisite knowledge of the visual language and presentation techniques involving various mediums.</li> </ul>				
<p><b>Course Outcome</b></p> <ul style="list-style-type: none"> <li>• Develop an orientation for seeing and sensitizing.</li> <li>• Express imagination, intuition, and engagement.</li> <li>• Express ideas, thoughts, and experiences through various visual modes.</li> <li>• Demonstrate in the forms of compositions and models in 2D and 3D.</li> </ul>				
<p><b>Textbooks</b></p> <ul style="list-style-type: none"> <li>• E.H. Gombrich- 'The Story of Art'</li> <li>• Partha Mitter, Parul Deve Mukhrji, Rakhee Balram- '20th Century Indian Art- modern, post-independence, contemporary'.</li> <li>• Matthew Collings- 'This is Modern Art'</li> <li>• Ocvirk, Stinson, Wigg, Bone and Cayton- 'Art fundamentals -theory and practice'</li> <li>• J.H. Bustano- 'Principles of Color and Color Mixing'.</li> <li>• Francis D.K. Ching- 'Drawing, Space, Form, Expression'.</li> <li>• Victor Perard- 'Anatomy and Drawing'.</li> <li>• Luis Slobodkin- 'Sculpture-Principle and Practice'.</li> <li>• Suzanne Huntington- 'Art of Ancient India'.</li> <li>• Roy C. Craven- 'Indian Art'.</li> <li>• J.C. Harle- 'Art &amp; Architecture of the Indian Sub-continent'.</li> </ul>				
<p><b>MODULE I (15 hours)</b>  <b>FUNDAMENTALS OF VISUAL ART AND DESIGN VOCABULARY</b></p> <ul style="list-style-type: none"> <li>• Introduction to art object- Definition and Interpretation.</li> <li>• Introduction to western art history- artistic tradition and theories, different isms/movements like realism, impressionism, expressionism, cubism, surrealism, constructivism, de stijl, abstract art, pop art, conceptual art.</li> <li>• Basic elements and principles of art and the correlation between art, design, and architecture.</li> </ul> <p><b>MODULE II (18 hours)</b>  <b>INTRODUCTION TO SOLIDS &amp; ORTHOGRAPHIC PROJECTION - Introduction</b></p> <p><b>COLOR THEORY AND RENDERING TECHNIQUES</b></p> <ul style="list-style-type: none"> <li>• Tonal value and variation, shading and texture techniques using pencil, pen and ink, pastels, water color, Poster color, acrylic color.</li> </ul>				

- Color wheel and Color theories- Chromatic Values, Two-dimensional/Three-dimensional aspects of Painting.
- Rendering of 2D shapes and 3D forms (geometric and organic).
- Perspectives and sciography- Use, Definition, Direction of Light, Location of the object, Shadow of architectural elements.
- Outdoor study- study of buildings in relation to the context and rendering in different mediums.

### **MODULE III (15 hours)**

#### **VISUAL PERCEPTION AND STUDY OF COMPOSITION**

- Gestalt theory of visual perception- Basic psychological aspects of lines, forms and colors.
- Creative exercises –visual composition and abstraction, logo design, collage, calligraphy and typography.
- Art appraisal- critical analysis of different art forms, expressions and Interpretations.

### **MODULE IV (18 Hours)**

#### **PART 1- INDIAN ART AND AESTHETICS**

- Introduction to Indian aesthetics- principles of Indian art, rasa theory.
- Different Indian Art forms- Development of Indian Art forms through different ages. Cave paintings, Indus valley art, Mural tradition, Miniature paintings, tribal and folk arts, company painting, Revival movement, Modern Indian Art.

#### **PART 2- FORM EXPLORATIONS AND SCULPTING**

- Languages, Methods & Techniques of Sculpture- Form, Texture, Mass and Volume.
- Sculpting in Clay or Plaster, Molding & casting.
- Installation Art and New media practices.

**Total Hours: 66 Hours**

### **CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments / Viva based on assignments	- 60 marks
Two internal tests each of equal weightage	- 30 marks
Attendance	- 10 marks

### **UNIVERSITY EXAMINATION PATTERN**

- Q I- 8 short-type questions of five marks, two from each module.  
 Q II - 2 Questions of 15 marks from module I with a choice to answer anyone.  
 Q III -2 Questions of 15 marks from module II with a choice to answer anyone.  
 Q IV -2 Questions of 15 marks from module III with a choice to answer anyone.  
 Q V - 2 Questions of 15 marks from module IV with a choice to answer anyone.

**Semester: First and Second (Combined)**

<b>Course No.</b>	<b>Course Name</b>	<b>L-T-S-P/D</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-18</b>	<b>MODEL-MAKING CARPENTRY</b>	<b>0-0-2</b>	<b>4</b>	<b>2022</b>

**COURSE OBJECTIVE**

- Equip students with the basic skills necessary to represent their ideas three-dimensionally using simple materials.
- Enable students to get acquainted with various tools for creating architectural models.
- Help students better comprehend the Basic Design and Architectural Graphics Studio exercise, as the subject is to be taught in coordination with them.

**COURSE OUTCOME**

- To demonstrate project presentation skills using simple as well as detailed architectural models.
- To create models ranging from study to presentation and in varying scales and materials.

## REFERENCE BOOKS

- Criss. B. M., “Designing with models: A Studio Guide to Architectural Process Models”, John Wiley & Sons, Hoboken, 2011
- Dunn, N., “Architectural Modelmaking”, Laurence King Publishing, 2013
- Model Making by Werner, Megan
- Schilling, A., “Basics Model-building”, Birkhauser, Berlin, 2007.
- Knoll, W. and Hechinger, M., “Architectural Models: Construction Techniques”, Cengage Publications, 2014

### MODULE I (6 hours)

Need for architectural models, Role of scale models in design; General practices in the model making; Types of models: block, detailed, construction & interior models. Introduction to concepts of model making and various materials used for model making. Techniques of cutting paper to create regular polygon shapes as 2D planes (3-sided to 10-sided polygons). Creating basic solid shapes such as squares, rectangles, circles & triangles with various paper mediums.

### MODULE II (8 hours)

Creating platonic solids with a suitable paper medium.

Making of models using free-flowing materials such as clay, Plaster of Paris, etc.

Introduction to block models of objects (3D Compositions) and buildings involving the use of various materials like Soap/Wax, Boards, Clay, etc.

### MODULE III (12 hours)

Introduction to Wood as a material.

Simple exercises in cutting, finishing, form exploration, and joinery with simple blocks, the composition of basic geometrical forms, etc.

Simple joinery details in wood. Use of carpentry tools and making joints such as Dovetail joint, Mortise, and Tenon joint, Lap joint, Butt joint, etc. Metal-welded joints, nut bolt joints.

### MODULE IV (14 hours)

Making models of the various structural systems used in buildings like; Space frames – using Match sticks, and wires; Different forms of shell roofs, and Tensile structures using fabric.

Creating a detailed building model: Exterior/interior using different materials and paper to represent the actual material on a suitable scale.

Flexible for the teacher to decide on assignments for representing innovative ideas and using new materials and techniques.

Ex: Architectural detailed models of famous buildings, Historic models, Working models, etc.

**Total: 40 hours**

### CONTINUOUS INTERNAL EVALUATION PATTERN:

- |   |            |
|---|------------|
| • Demonstrations / Presentations / Drawings (Course work) | - 50 marks |
| • Records / Portfolio                                     | - 20 marks |
| • Final test / Viva                                       | - 20 marks |
| • Attendance  | - 10 marks |



**Semester: First and Second (Combined)**

<b>Course No.</b>	<b>Course Name</b>	<b>L-T-S-P/D</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-19</b>	<b>DIGITAL ARTS &amp; GRAPHICS</b>	<b>0-0-2</b>	<b>4</b>	<b>2022</b>

**COURSE OBJECTIVE**

- To familiarize students with basic core skills of digital media.
- To support students to develop synthesis between observation/ analysis, and representation/documentation essentials within architecture
- To introduce and use range of digital media and vocabulary used in architecture
- To encourage students to use range of graphical and illustration medium to articulate design

**COURSE OUTCOME**

- To communicate ideas and arguments through range of digital media. To develop representation, observation, analysis, technical skills
- To demonstrate the use of various digital medium for progressing and developing architectural design
- To demonstrate the use of various tools and medium to speculate and provoke new ideas.
- To develop visual awareness and analysis, for developing critical thinking and representations.

## REFERENCE BOOKS

- Cook, S., 2013. *Drawing: The Motive Force of Architecture, 2nd Edition*. John Wiley & Sons.
- Calvino, I., 2013. *Invisible Cities.*: Houghton Mifflin Harcourt.
- Cook, S., 2016. *Architecture Workbook: Design through Motive*. John Wiley & Sons.
- Ingels, B., 2010. *Yes is more*. Köln: Taschen.
- Kahn, L. and Merrill, M., n.d. *Louis Kahn: The Importance of a Drawing*. USA: Lars Muller Publishers.
- Spiller, N., 2013. *Drawing architecture*. Chichester: Wiley.

## MODULE I (20 hours)

### **Photography:**

Photography as a medium of communication in architecture- Critical communication through photography, creative and speculative idea development.

### **Skill Development:**

Basic Introduction to digital photography  
Basics of image editing software like photoshop  
Post processing of images in software like photoshop

### **Sample Exercise:**

Suggested Projects for this module  
Preparing a collage to narrate a story of a place through the photographs students have taken  
Prepare a poster on a topic

## MODULE II (20 hours)

### **Film making:**

Relevance of motion pictures in architecture, concept communication

### **Skill Development**

Basic Introduction to digital videography  
Basics of video editing software like After Effects, Adobe Premiere Pro to build a project

### **Sample Exercise:**

Suggested Projects for this module  
Preparing a two-minute video to narrate an architectural story

## MODULE III (20 hours)

### **Architectural communication mediums I:**

Representation as integral part of design process and production – studying origins of architectural representation and its transformation to digital media and technology

The study of works of Archigram, Superstudio, BIG architects etc. to understand the way of communication of architecture projects through various mediums.

### **Skill Development**

Basic Introduction to graphic software like Adobe illustrator  
Basic Introduction to drafting software like Autocad

### **Sample Exercise:**

Suggested Projects for this module  
Prepare series of conceptual drawings to describe an architectural project, using images, drawings and illustrations.

**TOTAL HOURS: 60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

- Demonstrations / Presentations / Drawings (Course work) - 50 marks
- Records / Portfolio - 20 marks
- Final test / Viva - 20 marks
- Attendance - 10 marks



**UNIVERSITY OF CALICUT**

**Abstract**

Faculty of Engineering-B.Arch programme-Modified Curriculum and syllabus for Third and Fourth semester B.Arch Programme with effect from 2022 admission-Implemented subject to ratification by the Academic Council - Orders issued.

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**G & A - IV - E**

U.O.No. 10476/2023/Admn

Dated, Calicut University.P.O, 03.07.2023

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- Read:-*1. U.O.No. 20254/2022/Admn dtd.27.10.2022  
2. Item No.1 and 2 of the Minutes of the meeting of the Board of Studies in Architecture held on 30.05.2023  
3. Email dtd:01.07.2023 received from the Dean, Faculty of Engineering.  
4. Orders of Vice Chancellor in the file even no dated:01.07.2023

**ORDER**

1. As per U.O read as (1), the Regulation, Curriculum and syllabus for Combined First and Second semester B.Arch Programme with effect from 2022 admission was implemented subject to ratification by the Academic Council.
2. As per paper read as (2), the Board of Studies in Architecture modified and approved the B.Arch course curriculum. The Board also approved the Syllabus for Third and Fourth semester B.Arch Programme with effect from 2022 admission.
3. The above resolution of the Board of Studies in Architecture was approved by the Dean, Faculty of Engineering vide paper read as (3).
4. Considering the urgency, sanction has been accorded by the Vice Chancellor on 01.07.2023 to implement the Modified Curriculum and the Syllabus for Third and Fourth semester B.Arch Programme with effect from 2022 admission subject to ratification by the Academic Council.
5. The Modified Curriculum and the Syllabus for Third and Fourth semester B.Arch Programme with effect from 2022 admission is, therefore, implemented, subject to ratification by the Academic Council.
6. Orders are issued accordingly. (Modified Curriculum and syllabus appended)

Ajayakumar T.K

Assistant Registrar

To

1. The Principals of affiliated Architecture Colleges.
  2. The Controller of Examinations, Pareeksha Bhavan.
  3. The Deputy Registrar, B.Tech Branch Pareeksha Bhavan.
- Copy to:PS to VC/PA to PVC/PA to Registrar/PA to CE/DR,B.Tech/GA  
IF/Enquiry/SF/DF/FC

Forwarded / By Order





**University of Calicut**

**Curriculum**

**of**

**B.Arch. Degree Course**

**(With effect from 2022 admissions)**

## B. ARCH. CURRICULUM, 2022

Every course of B. Arch Program is categorized as shown in the table:

Course Category		
No	Category	Code
1	Professional Core	PC
2	Building Science and applied Engineering	BS & AE
3	Elective Course	EC
4	Professional Ability Enhancement Courses	PE
5	Skill Enhancement Course.	SE

Additionally, there are five subject groups as shown in the table:

Subject Groups	
Group No	Name
I	Studio Based Courses like Basic Design & Architectural Design
II	Theory cum Studio / Drawing Courses
III	Theory Courses
IV	Workshops / Labs / Working Drawing
V	Practical Training, Dissertation, Thesis and Viva Voce

COMBINED FIRST AND SECOND SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-11	Basic Design*	I	PC	16	0	1	7	0		200	300	500
AR 22-12	Theory Of Architecture	III	PC	4	2	0	0	3	100		50	150
AR 22-13	Building Materials & Construction -I	II	BS & AE	6	1	0	2	3	100		100	200
AR 22-14	Theory Of Structures-I	III	BS & AE	6	2	1	0	3	100		50	150
AR 22-15	History of Architecture-I	III	PC	4	2	0	0	3	100		50	150
AR 22-16	Architectural Drawing & Graphics	II	PC	8	2	0	2	3	100		100	200
AR 22-17	Visual Art & Aesthetics	IV	PC	6	1	0	2	3	100		100	200
AR 22-18	Model Making & Carpentry	IV	SE	4	0	0	2	0			100	100
AR 22-19	Digital Arts & Graphics	IV	SE	4	0	0	2	0			100	100
<b>TOTAL</b>				<b>58</b>	10	2	17		600	200	950	1750

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Tutorial of Basic Design to be dedicated for improving the Communication & Presentation Skills of the students.

THIRD SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-31	Architectural Design-I *	I	PC	10	0	1	9	0		200	300	500
AR 22-32	Building Climatology	III	PC	3	2	0	1	3	100		50	150
AR 22-33	Building Materials & Construction -II	II	BS & AE	4	2	0	2	3	100		100	200
AR 22-34	Theory Of Structures-II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-35	History of Architecture-II	III	PC	3	3	0	0	3	100		50	150
AR 22-36	Building Services-I (Water Supply & Sanitation)	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-37	Computer Aided Visualization - I	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>29</b>	<b>11</b>	<b>3</b>	<b>15</b>		<b>500</b>	<b>200</b>	<b>700</b>	<b>1400</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Tutorial of Climatology to be dedicated for conducting experiments in Building Science lab.

FOURTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-41	Architectural Design-II *	I	PC	10	0	1	9	0		200	300	500
AR 22-42	Site Analysis & Planning	I	PC	3	2	1	0	3	100		50	150
AR 22-43	Building Materials & Construction - III	III	BS & AE	4	2	0	2	3	100		100	200
AR 22-44	Theory Of Structures-III	III	PC	3	2	1	0	3	100		50	150
AR 22-45	History of Architecture-III	III	BS & AE	3	3	0	0	3	100		50	150
AR 22-46	Building Services-II (Lighting & Electrical Services)	I	PC	3	2	1	0	3	100		50	150
AR 22-47	Computer Aided Visualization - II	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>29</b>	<b>11</b>	<b>4</b>	<b>14</b>		<b>500</b>	<b>200</b>	<b>700</b>	<b>1400</b>

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* Two hours per week allotted to Library

**Note:**

One Hour Practical time of Site Analysis and Surveying to be earmarked for survey practical.

One Hour Studio time of Building Services to be dedicated in teaching the application of Building Services in the previous year design problem.

FIFTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-51	Architectural Design-III *	I	PC	10	0	1	9	0		200	300	500
AR 22-52	Landscape Design & Planning	III	PC	4	3	0	1	3	100		50	150
AR 22-53	Building Materials & Construction - IV	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-54	Design Of Structures-I	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-55	History of Architecture-IV	III	PC	3	3	0	0	3	100		50	150
AR 22-56	Building Services-III (HVAC & Mechanical Services)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-57	Specification & Cost Estimation	III	PC	3	1	2	0	3	100		50	150
<b>TOTAL</b>				<b>29</b>	13	4	12		600	200	650	1450

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Practical time of Building Services to be earmarked for conducting experiments in building science laboratory.

SIXTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-61	Architectural Design-IV *	I	PC	10	0	1	9	0		200	300	500
AR 22-62	Interior Design	II	EC	4	1	0	3	3	100		100	200
AR 22-63	Building Materials & Construction - V	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-64	Design Of Structures-II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-65	History of Architecture-V	III	PC	3	3	0	0	3	100		50	150
AR 22-66	Building Services-IV (Acoustics & Fire Fighting)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-67	Working Drawing	IV	PC	3	0	0	3	3			100	100
<b>TOTAL</b>				<b>29</b>	10	2	17		500	200	750	1450

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Studio time of Building Services to be dedicated to applying knowledge to a design problem.

SEVENTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-71	Practical Training *	V	PE	20	N.A.			0		300	300	600
<b>TOTAL</b>				<b>20</b>	0	0	0		0	300	300	600

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.



EIGHTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-81	Architectural Design-V *	I	PC	12	0	1	11	0		200	300	500
AR 22-82	Urban Design	III	PC	3	3	0	0	3	100		50	150
AR 22-83	Elective-I	III	EC	3	3	0	0	3	100		50	150
AR 22-84	Building Economics & Sociology	III	PC	3	3	0	0	3	100		50	150
AR 22-85	Research Methodology	III	PC	3	3	0	0	3	100		50	150
AR 22-86	Environment Science in Architecture	III	PC	3	3	0	0	3	100		50	150
AR 22-87	Building Information Modelling	IV	EC	2	0	0	2				100	100
<b>TOTAL</b>				<b>29</b>	15	1	13		500	200	650	1350

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour Studio time of Building Services to be dedicated to apply knowledge to a design problem.

**Elective I**

AR 22-86-1 Barrier Free Architecture

AR 22-86-2 Graphic and Product Design

AR 22-86-3 Computational Design in Architecture

AR 22-86-4 Sustainable Cities and Communities

AR 22-86-5 Cost-effective Architecture

AR 22-86-6 Road Safety and Civic Sense

NINTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-91	Architectural Design-VI *	I	PC	12	0	1	11	0		200	300	500
AR 22-92	Human Settlement Planning	III	PC	3	3	0	0	3	100		50	150
AR 22-93	Construction & Project Management	III	PE	3	3	0	0	3	100		50	150
AR 22-94	Professional Practice	III	PE	3	3	0	0	3	100		50	150
AR 22-95	Elective-II	III	EC	3	3	0	0	3	100		50	150
AR 22-96	Dissertation	V	PE	3	0	3	0	3		100	100	200
<b>TOTAL</b>				<b>27</b>	12	4	11		400	300	600	1300

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\*3 hours shall be allotted to Library/ Pre-Thesis Discussions

### Elective II

AR 22-96-1 Disaster Mitigation and Management

AR 22-96-2 Green Buildings and Rating systems

AR 22-96-3 Architectural Conservation

AR 22-96-4 Building Performance and Compliance

AR 22-96-5 Services in High rise Building

TENTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-101	Thesis *	V	PC	20	N.A.			0		300	300	600
<b>TOTAL</b>				<b>20</b>	N.A.			0		300	300	600

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

SEMESTER WISE CREDIT DISTRIBUTION										
Semester	1&2	3	4	5	6	7	8	9	10	Total
Credits	58	29	29	29	29	20	29	27	20	<b>270</b>

**University of Calicut**

**Syllabus**

**of**

**Third & Fourth Semester**

**B.Arch. Degree Course**

**(With effect from 2022 admissions)**

THIRD SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-31	Architectural Design-I *	I	PC	10	0	1	9	0		200	300	500
AR 22-32	Building Climatology	III	PC	3	2	0	1	3	100		50	150
AR 22-33	Building Materials & Construction -II	II	BS & AE	4	2	0	2	3	100		100	200
AR 22-34	Theory Of Structures-II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-35	History of Architecture-II	III	PC	3	3	0	0	3	100		50	150
AR 22-36	Building Services-I (Water Supply & Sanitation)	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-37	Computer Aided Visualization - I	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>29</b>	11	3	15		500	200	700	1400

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* One hour per week allotted to Library

**Note:**

One Hour of Climatology to be dedicated for conducting experiments in Building Science lab.

<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/D</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22-31</b>	<b>ARCHITECTURAL DESIGN-I</b>	<b>0-1-9</b>	<b>10</b>	<b>2022</b>
<b>Course Objectives</b>				
<p>The Architectural Design I course for students of architecture would,</p> <ul style="list-style-type: none"> <li>• Help them to understand space requirements related to human activities and study anthropometric data.</li> <li>• Introduce concept to the process of design.</li> <li>• Introduce students to standards and norms related to different functions.</li> <li>• Introduce students to rules and regulations related to building design.</li> <li>• Enable them to conceive 3 dimensional forms and establish relation to functional requirements which will result in optimal utilization of space.</li> <li>• Help them to develop a basic understanding of building materials.</li> </ul>				
<b>Course Outcome</b>				
<p>After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• To develop a basic understanding of space, form, structure and the built environment</li> <li>• Application of knowledge to initiate architectural design process by using space standards and environmental aspects to formulate concepts and design.</li> <li>• Analysis and inference through data collection, case studies of projects related to the design project and developing skills so as to create a design programme.</li> </ul>				
<b>Reference Books</b>				
<ul style="list-style-type: none"> <li>• De Chiara and Callender, Time Saver Standard for building types, McGraw Hill Co.</li> <li>• Neufert Architect's data, Bousmaha Baiche &amp; Nicholas Walliman, Blackwell science ltd.</li> <li>• KMBR • Simon Unwin, "Analyzing Architecture", Routledge 2003</li> <li>• Francis D.K.Ching, "Architecture, Form, Space and Order"; III Edition, John Wiley, 2007</li> <li>• Leland M.- Roth, "Understanding Architecture: Its Elements- History, and Meaning", Icon Editions, 1993</li> <li>• Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press 1964</li> <li>• Peter von Meiss, "Elements of Architecture - From Form to Place", Span Press, 1992</li> <li>• Bryan Lawson, "How Designers Think", Architectural Press Ltd" London, 1980.</li> </ul>				
<b>Projects:</b>				
<p><b>Two projects - one minor and one major - shall be completed during this semester and these shall have minimum complexity in terms of design and site challenges.</b></p>				
<p><b>Minor Project:</b> Design of small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale like bus shelter/ fast food kiosks/ entrance gateways/ park Shelters etc.</p>				
<p><b>Major Project:</b> Design of a residence within a set of limited specific requirements</p>				
<b>Process &amp; Deliverables:</b>				
<ul style="list-style-type: none"> <li>• Students should attempt data collection from various reference books, carryout adequate</li> </ul>				



number of relevant case studies.

- The concepts of architectural programming shall be introduced to assist the design process.
- Handmade sketches, manual drafting and scaled study models shall be made part of the design process.
- Deliverables shall be manually drafted presentation drawings including free hand perspectives, scaled working models etc.

**TOTAL HOURS: 120**

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews: 270 Marks

Attendance: 30 Marks

<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-32</b>	<b>BUILDING CLIMATOLOGY</b>	<b>2-0-1</b>	<b>3</b>	<b>2022</b>
<p><b>Course Objectives</b>  The Building Climatology course for students of architecture would,</p> <ul style="list-style-type: none"> <li>• Help students develop an understanding and appreciation of climate and its influence on built form and architecture of a region.</li> <li>• Equip the students with the competence required to design climate responsive buildings, by providing an understanding of the various climatic zones and the climate responsive considerations in the design of spaces – built-up and open.</li> </ul>				
<p><b>Course Outcome</b>  After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• An understanding of the relation of climate to human comfort.</li> <li>• Awareness about various types of climates and the corresponding design strategies for climate-responsive buildings and spaces.</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>• Koenisberger, O. H., Ingersoll, T.G., Mayhew, A. and Szokolay, S.V., Manual of Tropical Housing and Building – Climatic Design, Orient Longman Pvt Ltd, Chennai, 2003.</li> <li>• Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), BIS, New Delhi, 1995.</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• Krishnan, A., Szokolay et.al, Climate Responsive Architecture-A Design Handbook for Energy Efficient Buildings, Tata McGraw Hill, New Delhi, 2010.</li> <li>• Evans, M., Housing Climate and Comfort – Architectural Press, London. (1980).</li> <li>• Allan, K., Design Primer for hot Climates, The Architectural Press Ltd, London, 1980.</li> <li>• Givoni, B., Passive and low energy cooling of Buildings, John Wiley and Sons, 1994.</li> <li>• Markus, T.A. and Morris E. N., Buildings Climate and Energy, Pitman Pub., 1980.</li> <li>• Fry. M and Drew. J, Tropical Architecture in the Dry and Humid Zones, Londres: Bestford, 1964.</li> <li>• Giovoni, B., Man, Climate and Architecture, Van Nostrand Reinhold, 1981.</li> <li>• Kukreja, C.P.,Tropical Architecture, Tata McGraw Hill Pub. Co. Ltd New Delhi, 1978.</li> <li>• Olgyay, A. and Olgyay, V., Solar Control and Shading Devices, Princeton University Press, New Jersey, 1976.</li> </ul>				

**MODULE I (10 hours)****UNDERSTANDING CLIMATE (12 Hours)**

Climate and weather definitions- Elements. Measurement. representation of data- climatic zones – micro and macro climate — global climatic zones characteristics (temperature, humidity, wind, precipitation, etc). Weather Tools to Analyze Climate Data (Climate consultant , Ecotect Etc )

**MODULE II (10 hours)****CLIMATE, BODY AND COMFORT**

Human body heat balance – comfort in different climatic zones – ET/CET concept and application – comfort indices – bioclimatic chart.

**MODULE III (16 hours)****NATURE OF CLIMATE**

Heat transfer (concepts, terminology, units) - Hot air, solar gain, K- value, U value, Heat exchange – transmittance, thermal gradient, heat flow concepts, time lag & decrement. Geometry of solar movement – altitude, azimuth, sun path, solar chart, shadow – angles,

Ventilation and air movement – functions, stack effect, air movement through building, humidity. Transmittance of composite walls.

**MODULE IV (16 hours)****CLIMATE AND BUILDINGS**

Thermal characteristics of building materials and components, structural controls, heat absorptive materials. Vernacular techniques of climatic adaptation. Design for different climatic zones – passive design techniques in built and unbuilt environment.

Climatic design process:

Design of shading devices: Horizontal and vertical shadow angles, Use of shadow angle protractor

Design using wind tunnel, solar scope, heliodone and analysis of 3D analog & digital models using software.

TOTAL HOURS: 54

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.

Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-33</b>	<b>BUILDING MATERIALS AND CONSTRUCTION II</b>	<b>2-0-2</b>	<b>4</b>	<b>2022</b>
<p><b>Course Objectives</b>            The building materials and construction course for students of architecture would,</p> <ul style="list-style-type: none"> <li>• Introduce the study of building materials (concrete, iron, steel &amp; aluminium), their application and construction methods.</li> <li>• Knowledge of construction techniques with sustainable building practices.</li> </ul>				
<p><b>Course Outcome</b>            After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• Demonstrate an understanding of the basic principles of building construction including the roles of structural systems, building components, and materials.</li> <li>• Exposure to the common construction techniques used for constructing various components of a building.</li> <li>• Develop architectural drafting skills for the representation of construction details.</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>• Arora S.P. and Bindra S.P., “Text book of Building Construction”, Dhanpat Rai &amp; Sons, New Delhi, 2012.</li> <li>• P C Varghese, Building Materials, Prentice Hall of India Pvt. Ltd, New Delhi, 2010</li> <li>• Shetty M.S, Concrete Technology</li> <li>• Francis D.K. Ching, Building Construction Illustrated John Wiley &amp; Sons 2000.</li> <li>• Balagopal T.S. Prabhu, “Civil Engineering Drawing Hand book”</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• Don A. Watson Construction Materials and Processes McGraw Hill 1972.</li> <li>• WB McKay Building construction, Vol 1,2, Longman UK 1981.</li> <li>• Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.</li> <li>• Neville A M and Brooks J J , Concrete Technology.</li> </ul>				
<p><b>MODULE I</b>  <b>CONCRETE (12 hrs)</b>            Ingredients of Concrete: Cement, Fine aggregate, Coarse aggregate, Water, Reinforcement, Various types of concrete and applications.  <b>Process of concreting &amp; concrete construction techniques:</b> Formwork for concrete, Cutting, bending and placing of reinforcement, scaffolding, batching, mixing, placing, compacting, curing.            Properties of concrete: fresh concrete, workability, segregation and bleeding, factors affecting workability &amp; strength, water -cement ratio.  <b>Mix Design of concrete</b>-Understanding concrete mix design, Grades of concrete, PCC &amp; RCC.  <b>Specifications for concreting</b> : CPWD manual, Relevant BIS Codes  <i>Exercise: Concrete - onsite experience – listing out observations and site report</i></p>				
<p><b>MODULE II</b>  <b>DEEP FOUNDATION (16 hrs.)</b>  <b>Pile foundation:</b> Need for deep foundations, Classification of piles according to function: End</p>				

bearing piles, friction piles, screw piles, sheet pile, tension/uplift pile, batter piles, fender piles, sheet piles.

Classification based on materials and composition: Concrete piles, Timber piles, Steel piles, Composite piles

Precast and cast in situ piles, Driven and Bored piles, Cased and uncased cast in situ concrete piles, pressure piles, Under reamed piles, Bored compaction piles. Sand piles, Pile Cap

Caissons: Box caissons, Open caissons & pneumatic caissons, Timbering and trenching of foundations.

**Exercise: Drawings of various types of Pile foundations-Concrete pile, steel pile .(Refer to IS codes)- Site visit & Observations**

### **MODULE III**

#### **IRON, STEEL, ALUMINIUM (12 hrs.)**

**Iron:** Forms of Iron used for building construction–Properties and applications in construction.

**Steel:** Properties , Uses, Anti corrosive measures, mechanical and heat treatment of steel.

Forms of steel used for building construction: steel for reinforcement-Hot rolled bars, Cold rolled steel, TMT bars, Welded wire fabrics. Structural Steel, Stainless steel, Steel alloys, advanced uses of steel.

**Aluminium:** Properties, applications in construction, available forms- Extrusion, casting, foil, powder & sheet -finishes - anodising, surface texture ,colour coating & painting.

**Exercise : Market study - study of standard aluminium steel products and profiles used for building construction .**

**Refer to relevant BIS codes for the specifications.**

### **MODULE IV**

#### **JOINERY, DOORS & WINDOWS (16 hrs.)**

**Joinery:** Wooden joinery details, terms for various members, fasteners and fixtures used in joinery.

**Door:** Different types of doors and uses. Wooden doors, Steel doors ,Aluminium doors PVC doors, glass doors,Solid doors, Flush doors, revolving doors, folding doors, sliding doors, swingingdoors, collapsible doors.

**Windows:** Aluminium, Steel & UPVC windows - French windows, bay windows, awning window ,and louvered windows - fixed, casement, sliding & pivoting windows.

**Drawings: Battened door , slidingdoor details, folding door Aluminium , steel window , Joinery details.**

**TOTAL HOURS-56**

#### **CONTINUOUS INTERNAL EVALUATION PATTERN:**

Assignments / Viva based on assignments	- 60 marks
Two internal tests each of equal weightage	- 30 marks
Attendance	- 10 marks

#### **UNIVERSITY EXAMINATION PATTERN**

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.

Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.



<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-S-P/D</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-34</b>	<b>THEORY OF STRUCTURES-II</b>	<b>2-1-0</b>	<b>3</b>	<b>2022</b>
<p><b>Course Objectives</b>            The Theory of Structures II course for students of architecture would help</p> <ul style="list-style-type: none"> <li>• To develop an overall understanding of structural behavior of structural elements under various loading conditions.</li> <li>• To interpret shear force and bending moment diagrams for various types of beams and loading conditions.</li> <li>• To study the internal stresses (bending and shear stresses) in beams and strength of sections.</li> </ul>				
<p><b>Course Outcome</b>            After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• Understand the various structural elements in a building and types of loads acting on it.</li> <li>• Achieve fundamental knowledge of the sectional properties of various sections.</li> <li>• Analyze different types of beams with different loading conditions.</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>• S.S Bhavikkatti, Strength of materials, New Age International Publishers</li> <li>• R.S. Khurmi, Strength of materials, S. Chand &amp; Company Ltd, New Delhi</li> <li>• R. K. Bansal., Strength of Materials, Lakshmi Publications Pvt. Ltd., New Delhi</li> <li>• S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt. Limited</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• F.V. Warnock, Strength of Materials, Sir Isaac Pitman Sons Ltd.</li> <li>• E.P. Popov, Mechanics of Materials, SI Version, Prentice Hall, India</li> <li>• William. A. Nash, Strength of Materials, SI Version, Schaum's Out line Series</li> <li>• S. S. Bhavikkatti, Structural Analysis Vol. I, Vikas Publishing House Pvt. Ltd.</li> <li>• Ramamrutham S. and R. Narayan, Theory of Structures, Dhanpat Rai Publishing Co., 2012</li> <li>• R. K Bansal., Strength of Materials, Lakshmi Publications Pvt. Ltd</li> <li>• M. M. Ratwani &amp; V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.</li> <li>• Timoshenko, S. P. and D. H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993</li> </ul>				

**MODULE I (12 hours)**

- Beams - different types. Types of loading on beams.
- Concept of bending moment and shear force, Sign convention
- Shear force and bending moment diagrams of cantilever beams, simply supported beams and overhanging beams for different type of loads (Point load, uniformly distributed load, Moment). Point of contra flexure.
- Relationship between intensity of load, shear force and bending moment.

**MODULE II (12 hours)**

- Theory of simple bending, Derivation of equation, assumptions and limitations.
- Calculation of normal stress in beams, moment of resistance
- Variation of bending stress across the cross section, Maximum bending stress, section modulus, moment of resistance. Beams of uniform strength, bending of composite beams – simple problems

**MODULE III (10 hours)**

- Shear stress in beams – derivation of equation.
- Variation of shear stress across the cross section.
- (Derivation required for rectangular, circular and triangular sections only)
- Stress on inclined planes for axial and bi-axial stress fields, principal stresses, Mohr's circle of stress, principal stresses. (Concept only).

**MODULE IV (14 hours)**

- Differential equation of the elastic curve
- Slope and deflection of beams by method of successive integration,
- Slope and deflection of beams by Macaulay's method,
- Slope and deflection of beams by moment area method.
- Deflection of beams by strain energy method -application to simple beams. (Only concentrated load, uniformly distributed loads required)

**TOTAL HOURS: 48**

**UNIVERSITY EXAMINATION PATTERN**

- Q I - 8 Short type questions of 5 marks, 2 from each module.  
Q II - 2 Questions of 15 marks from module I with choice to answer any one.  
Q III - 2 Questions of 15 marks from module II with choice to answer any one.  
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone

<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 17-35</b>	<b>HISTORY OF ARCHITECTURE II</b>	<b>3-0-0</b>	<b>3</b>	<b>2022</b>
<p><b>Course Objectives</b>  The objective of the course is to develop an understanding of appreciation of Islamic architecture and its influence in India's local and regional history of architecture, its changes in social processes and lifestyle. Architecture is to be seen as an important and long-lasting by-product of development of civilization by understanding the role of technology, construction techniques, climate and materials with inherent visual aspects like spatial organization, scale, compositional organization, Architectural vocabulary and design grammar.</p>				
<p><b>Course Outcome</b>  After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>Identify major typologies, characteristics and forms of Islamic architecture.</li> <li>Identify major succeeding dynastic periods together with principal monuments and their main stylistic features.</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>Percy Brown , 'Indian Architecture ( Islamic Period) ' ,D.B. Taraporevala Sons &amp; Co. Private Ltd., Bombay, 1997.</li> <li>Satish Grover , 'Islamic Architecture in India', CBS Pub, New Delhi, 2002</li> <li>Banister Fletcher, Dan Cruickshank Sir Banister Fletcher's a History of Architecture, Architectural Press, 1996</li> <li>Christopher Tadgell , 'The History of Architecture in India', Phaidon Press Ltd, 1994.</li> <li>John Julius Norwich : Great architecture of the world</li> <li>Stephen Gardiner: Introduction to architecture</li> <li>Henri Sterlin : Encyclopedia of world Architecture</li> </ul>				
<p><b>MODULE I - (12 Hours)</b>  A brief introduction into origin &amp; characteristics of Islamic architecture: building types, elements, structural systems, construction techniques.  Islamic Architecture of :  <b>Syria and Egypt</b>- Great Mosque of Damascus, Syria ; Dome of the Rock, Jerusalem ; The Mosque of Ahmad Ibn Tulun, Cairo.  <b>Persia</b> - The Masjid-i Shah, Isfahan.  <b>Spain</b> - The great mosque at Cordoba, The Alhambra Palace.  <b>Morocco</b> -King Hassan II Mosque, Casablanca.</p>				
<p><b>MODULE II - (10 Hours)</b>  Beginning of Islamic Architecture in India; Islamic Architecture in Delhi (Imperial Style)  <b>Mamluk Dynasty</b> -Quwat-ul-Islam mosque, Qutb Minar, Sultan Ghari, Tomb of Iltumish, Tomb of Balban.  <b>Khilji Dynasty</b> -Alai Darwaza, Jamat Khana masjid  <b>Tughlaq Dynasty</b> -Tomb of Ghias-Ud-din, City of Tughlaqabad, City of Firoz Shah Kotla, Khirki Mazjid. <b>Sayyid and Lodi Dynasty</b>-Tomb of Mubarak Shah, Tomb of Mohamed Sayyid, Garden tomb of Sikander Lodi , Bara Khan ka Gumbad, Chota Khan ka Gumbad, Shish Gumbad, Bara Gumbad.</p>				
<p><b>MODULE III - (10 Hours)</b>  Provincial styles:  <b>Punjab</b> -Tomb of Shah Rukhn-I-Alam.  <b>Jaunpur</b> -Atala Masjid, Jami Masjid</p>				

**Bengal** –Dakhil Darwaza, Firoze Minar, and Adina Masjid.

**Gujarat** -Jami Masjid, Teen Darwaza, Well retreats of Ahmedabad.

**Malwa** –Hindola Mahal, Jami Masjid at Mandu, Jahaz Mahal.

**Deccan** - Charminar at Hyderabad, Tomb of Golconda.

**Bijapur** - Jami Masjid, Golgumbaz.

#### **MODULE I V- (10 Hours)**

Evolution of Mughal style and the contributions during the different eras of rule:

Early period:

**Babar**- Jama Masjid, Sambhal; **Humayun**- City of Din Panah; **Sher Shah**- Qila Kunha Masjid, Sher Shah's Tomb

**Akbar** - Tomb of Humayun; Jahangir Mahal, Agra; Fatehpur Sikri - city planning & the various structures inside.

**Jahangir** -Akbar's tomb.

**Shah Jahan** -Red fort at Agra, Taj Mahal, City of Shahjahanabad (Delhi fort, Jami Masjid at Delhi).

**Aurangzeb** -Tomb of Rabi Durrani at Aurangabad, Moti Masjid at Delhi fort.

**TOTAL HOURS: 42**

#### **UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III -2 Questions of 15 marks from module II with choice to answer anyone.

Q IV -2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

<b>Semester: Third</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/D</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22-36</b>	<b>BUILDING SERVICES-I (WATER SUPPLY AND SANITATION)</b>	<b>2-1-0</b>	<b>3</b>	<b>2022</b>
<p><b>Course Objectives</b> The objective of the course is to help students to develop an understanding of the fundamentals of water supply and sanitary engineering - students will learn about sources of water, water treatment, waste water treatment, solid waste management, etc.</p>				
<p><b>Course Outcome</b> After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• Understand about demand, consumption, sources, treatment and distribution of water.</li> <li>• Acquire knowledge about treatment and disposal of wastewater, and solid-waste management.</li> </ul>				
<p><b>Text books</b> Modi, P. N., Sewage Treatment and Disposal and Wastewater Engineering, Standard Book House, New Delhi, 2008. Birdie, G. S., and Birdie, J. S., Water Supply and Sanitary Engineering, Dhanpat Rai and Sons, New Delhi, 2007. Garg, S. K., Environmental Engineering, Vol. II, Khanna Publications, New Delhi, 2009. Duggal, K. N., Elements of Environmental Engineering, S Chand and Co. Ltd., New Delhi, 2008.</p>				
<p><b>Reference Books</b> Mark J. Hammer and Mark J. Hammer Jr., Water and Waste Water Technology, Prentice Hall of India Pvt. Ltd. New Delhi, 2009. Ernest W. Steel and Terence J. Mc Ghee, Water Supply and Sewerage, McGraw Hill, New York, 1991. Ehlers, V. M. and Steel, E. W., Municipal and Rural Sanitation, McGraw Hill, 2009. Fair, Geyer and Okun, Water and Wastewater Engineering, John Wiley and sons, Inc., 2010 Metcalf and Eddy, Wastewater Engineering Treatment, Disposal and Reuse, Tata McGraw Hill, 2007. Kiely, G., Environmental Engineering, McGraw Hill, McGraw Hill, 2009. Relevant BIS Codes.</p>				
<p><b>MODULE I (8 hours)</b> <b>Water</b> Water Supply Engineering – Quantity of water, types of water demand, fluctuation in demand, factors affecting consumption Forecasting population – design period. Sources of water – surface water sources, intakes, ground water sources. Quality of water – drinking water standards – physical, chemical and bacteriological analysis of water.</p> <p><b>MODULE II (16 hours)</b> <b>Water treatment</b> Treatment of water – aeration, coagulation, flocculation, sedimentation, filtration, disinfection.</p>				



**Miscellaneous and advanced treatment methods:**

removal of iron and manganese, fluoridation and de- fluoridation, water softening, arsenic removal, desalination, membrane filtration.

**Transmission of water**

Types - gravitational, pumping and combined schemes.

Lay out of distribution networks, intermittent and continuous systems of distribution

**MODULE III (12 hours)****Wastewater**

Systems of sanitation, types of sewerage systems, components of a sewerage systems, Wastewater characteristics

**Wastewater treatment**

Preliminary treatment of wastewater – screens, grit chamber, detritus tank, sedimentation tank.

Biological treatment - Activated sludge process, Trickling filter, Oxidation pond.

**Wastewater disposal**

disposal into land, water bodies - stream, ocean -disposal by irrigation . Septic tank and soak pit.

**MODULE IV (12 Hours)****Sewage collection from houses and building**

General principles governing the design of a sanitary plumbing system

Functions and types of traps used in sanitary plumbing systems

systems of plumbing (4 types)

sanitary fittings and other accessories

**Disposal of municipal solid waste**

Solid waste management - collection, transportation and segregation of MSW, recycling.

Disposal of MSW - sanitary land fill, incineration, composting.

Understanding of service drawings. Site visit with documentation in the form of sketches/drawings and photos

**Total Hours: 48**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

**Semester: Third**

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AR 22-37	COMPUTER AIDED VISUALIZATION-I	0-0-3	3	2022

**Course Objective**

- Enable learning of CAD software by doing graded exercises
- Help them to understand various CAD Commands – creating two dimensional drawings and editing commands.
- Help in the preparation of hardcopy of drawings using normal architectural scales.
- Help them in creating 3D of buildings using Sketchup

**Course Outcome**

After the completion of this course, the students will be able to

- Achieve an understanding of CAD software for preparing two-dimensional drawings.
- Create 3D architecture forms

**Reference Books**

Omura George, “Mastering AutoCAD, BPB Publications, New Delhi

- AutoDesk AutoCAD Manual
- Kolareric Branko, Architectural Rendering and Modelling with AutoCAD, John Wiley, New York, 1998.
- Synder James, Architectural Construction Drawings with AutoCAD, John Wiley, New York, 1998

**MODULE 1 (35 hours)**

All commands needed for the preparation of drawing Plan, Elevation and Section in Autocad

- Revision of basic commands  
(Commands- Units, Line, Polyline, Circle, Rectangle, Arc, Spline, Hatch, Extension line, Limits, LTscale, Measure, pan, zoom, Move, Copy, rotate, Stretch, Extend, Mirror, Offset, Array, Trim, Break, Linetype, Text, Mtext, Dist, Area, fillet, Redraw, Regen, Purge, Flatten)
- Creation and importing of blocks into AutoCAD
- Coordinate system-UCS, WCS
- Understanding layers and usage of CTB for doing drawings with proper gradation
- Dimensioning- Linear, Angular, Radial
- Model space & Paper space, To setup sheet in paper space, Incorporating title block and setting sheet layout
- Plotting

**Exercises**

1. Starting up - Drawing I- Measured drawing (plan and section) of a room.
2. Architectural Drawing II- Drawing Plans using layers, sections and elevations of Residence design project, setting the drawings in sheet using layout.

**MODULE 2 (25 hours)****3D Modelling using Sketchup**

- Importing 2D Plan from AutoCAD
- Setting up Scale and Units

- Basic commands- Push/Pull, Paint bucket, Move, Rotate, Scale, Measure, Introduction to basic tools-line, eraser, circle, rectangle, arc,
- Importing additional blocks, components etc. (window, doors, trees, furniture's)
- Application of materials
- V-ray/other Plugins for rendering

**Exercises**

1. Starting up – Basic 3d model of a house with application of materials, windows, doors, landscaping etc.
2. 3D Rendering using V-Ray - of the same project

**Other Suggested Projects for the lab:**

- 1) Graded exercises - measured drawing, site plan, Component details. Lettering, dimensioning & Layering standards.
- 2) Preparation of drawings in layers & layouts.
- 3) Municipal drawing preparation for a medium-sized residence.
- 4) Starting up- Preparing drawing with layer system, CTB & Creating hatch patterns, Importing /exporting files

**TOTAL HOURS: 60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

- |   |            |
|---|------------|
| • Demonstrations / Presentations / Drawings (Course work) | - 50 marks |
| • Records / Portfolio                                     | - 20 marks |
| • Final test / Viva                                       | - 20 marks |
| • Attendance  | - 10 marks |

FOURTH SEMESTER												
Course Code	Subject	Group	Category	Credits	Hours Per Week **			Duration of Exam	Marks			
					L	T	P/S		W	J	C.A.	Total
AR 22-41	Architectural Design-II *	I	PC	10	0	1	9	0		200	300	500
AR 22-42	Site Analysis & Planning	I	PC	3	2	1	0	3	100		50	150
AR 22-43	Building Materials & Construction - III	III	BS & AE	4	2	0	2	4	100		100	150
AR 22-44	Theory Of Structures-III	III	PC	3	2	1	0	3	100		50	150
AR 22-45	History of Architecture-III	III	BS & AE	3	3	0	0	3	100		50	150
AR 22-46	Building Services-II (Lighting & Electrical Services)	I	PC	3	2	1	0	3	100		50	150
AR 22-47	Computer Aided Visualization - II	IV	SE	3	0	0	3	0			100	100
<b>TOTAL</b>				<b>29</b>	11	4	14		500	200	700	1400

\* Evaluation by the Jury as per the B. Arch Degree Manual, L - Lecture, T - Tutorial, P/S - Practical/Studio, W - Written University Examination, J - Jury, C.A. - Continuous Assessment.

\*\* Two hours per week allotted to Library

**Note:**

One Hour Practical time of Site Analysis and Surveying to be earmarked for survey practical.

One Hour Studio time of Building Services to be dedicated in teaching the application of Building Services in the previous year design problem.

**Semester: Fourth**

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-41	ARCHITECTURAL DESIGN-II	0-1-9	10	2022

**Course Objectives**

The Architectural Design II course for students of architecture would help,

- To create a holistic understanding of the socio-cultural, geographic and economic aspects that shapes the built environment
- To expose students to the methodology of conducting various surveys covering physical, visual characteristics and demographic aspects.
- To introduce concept to the process of design.
- To understand the climatic and topographic aspects related to the site and how they influence the design.
- To undertake a comprehensive study of a building/settlement/ or part of an urban area that is an example of design evolved organically over a period of time.
- To emphasis the importance of designing built form and open spaces that meet the aspirations of the community.

**Course Outcome**

After the completion of this course, the students will be able to

- Achieve an understanding of design as a response to context and program and develops a holistic approach to design.
- Develop skills to create architectural solutions for simple problems with a thrust on evolution of concepts and response to site and climatic challenges.

**Reference Books**

- Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975 Ramsey et al, "Architectural Graphic Standards", Wiley, 2000 Kevin Lynch, "Site planning", MIT Press, Cambridge, 1984 Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995
- Francis D. K. Ching, 'Architectural Graphics', Wiley, 2009 Francis D. K. Ching, 'Architecture: Form, Space and Order', John Wiley & Sons, 2007
- Simon Unwin, 'Experiencing Architecture', Routledge, 2003
- Simon Unwin, 'An Architecture Notebook' Routledge, 2000 Geoffrey Broadbent, 'Design in Architecture' John Wiley and Sons, 1973
- Simon Unwin, 'Doorway', Routledge, 2007

**Projects: Two projects - one minor and one major - shall be completed during this semester and these are to address context in terms of topography, site and built elements.**

**Major Project**

A detail study of any rural settlements, or any vernacular settlements needs to be undertaken to understand basic aspects of human built environment. The study should include

- The interrelationship between built form and society will be studied, understood and established, starting from either end as required.
- Study of specific modes of rural/vernacular/traditional architecture including their morphology, local materials and construction techniques, details, meaning, etc., will be done

to give an insight into the particulars and universals of architecture.

- Appropriate tools and processes can be used to aid the understanding. These include different methods of historical and socio-cultural study, oral history, discussions, information collection, surveys, maps, perceptual sketches, documentation through drawings, demographic study, assimilation and analysis.
- Transformations across time need to be traced to understand constants and dynamics in human society. They will also be critically evaluated through discussions with experts. Rising from this, future changes can be projected/ envisaged and if found required, policy and physical interventions can be suggested/ explored.

### **Minor Project**

- The physical interventions necessary which are found in the major project will be taken up as design situations. This could range from individual to community level and involve any aspect of the physical environment (including building projects) as the situation/viewpoint warrants.
- If the context does not warrant a building need, a small community oriented building design will be given as a separate project in addition to the major project. For building projects, the scale and complexity of planning and construction usually involved will be simple - small or medium span, ground plus two storeyed maximum, simple horizontal and vertical movement, simple/ local materials and construction, passive energy.

### **Process and deliverables:**

Students should conduct data collection from various reference books, study the context, conduct relevant case studies; carry out detailed site analysis before attempting design. Formulation of a detailed design brief, evolution of concept shall be part of the architectural programming. Handmade sketches, manual drafting and scaled study models shall be made part of the design process. Deliverables shall be manually/digital drafted presentation drawings including free hand perspectives, graphical representation of concept, scaled models etc.

**TOTAL HOURS: 160**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Design exercises, projects, tests, and internal reviews: 270 Marks

Attendance: 30 Marks



<b>Semester: Fourth</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-42</b>	<b>SITE ANALYSIS &amp; PLANNING</b>	<b>2-1-0</b>	<b>3</b>	<b>2022</b>
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>To understand the importance of site in architectural design whereby the relationship between the built and the un-built environment and principles of site planning is established.</li> <li>To analyse ecological and geomorphological characteristics of a site which govern the siting of a building or group of buildings in a given site.</li> <li>To teach various techniques of site analysis through exercises and case studies.</li> </ul>				
<b>Course Outcome</b> After the completion of this course, the students will be able to <ul style="list-style-type: none"> <li>Learn various terms involved in site planning and their relevance in design of buildings of varying scales</li> <li>Understand various parameters that need to be considered in site analysis and its implications on site</li> <li>Evaluate the consequences of interventions in a site at micro and macro scales</li> <li>Apply the principles of site planning learnt in real/ studio projects</li> </ul>				
<b>Text books</b> <ul style="list-style-type: none"> <li>Kevin Lynch, 'Site Planning', MIT Press, Cambridge, MA. 1957.</li> <li>White T. Edward, 'Site Analysis: Diagramming Information for Architectural Design', Architectural Media Publisher, 1983</li> <li>James A La Gro, Site Analysis, Informing Context Sensitive and Sustainable Site Planning and Design, John Wiley and Sons, 2013</li> </ul>				
<b>Reference Books</b> <ul style="list-style-type: none"> <li>John Ormsbee Simonds, 'Landscape Architecture: A manual of Site Planning and Design', McGraw Hill, 1961. • McHarg, Ian, 'Design With Nature', Wiley Series in Sustainable Design, 1995</li> <li>Joseph De Chiarra and Lee Copleman, 'Planning Design Criteria', Van Nostrand Reinhold Co., New York, 1988.</li> <li>Thomas H. Russ, 'Site Planning and Design Hand Book', Pearson Education, 2002.</li> <li>Christopher Alexander et.al., A Pattern Language: Towns, Buildings, Construction (Center for Environmental Structure Series), 2015</li> </ul>				
<b>MODULE I (10 hours)</b> <b>Site Surveying</b> <b>Introduction: Importance and principles of Surveying.</b> Chain surveying, Compass surveying, Theodolite surveying, Plane table surveying Levelling: levelling instruments-temporary and permanent adjustment of dumpy and tilting level- Height of instrument method, Rise and fall method <b>Introduction to modern surveying equipment's:</b> UAV Drone, Total Station, GPS, Distomat, Digital Levels and Auto-Levels Electromagnetic distance measurement (EDM) - Principle of EDM ,Total Station – Parts of a Total Station – Accessories – Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey. <b>Exercise 1:</b> Computation of height, distance and area using Total Station <b>Exercise 2:</b> Determination of elevation of points on ground by differential levelling				

**MODULE II (20 hours)**

**Site Analysis**

Importance of site analysis - On site and off-site factors - Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects, visual analysis

**Preparation of site analysis diagram.** Study of contours: slope analysis - grading process - grading criteria - functional and aesthetic considerations.

Environmental consideration, Site Analysis tools and Techniques

**Exercise:** Preparation of Slope analysis, Relief map and drainage map for Contour Site

**MODULE III (20 hours)**

**Site Planning**

Definition of plot, site, land and region, units of measurements.

Objective of Site Planning, Site Planning Process, Design and management of site, Site Planning and Site Layout Principles

Site Context: Impact of proposed development on surrounding- aspects such as increase in traffic, noise and pollution to surroundings, Environment impact assessment, study through notable examples

**MODULE IV (10 hours)**

Site design guidelines for Pedestrians- Open space requirements- Playground design-seating.

**Street and Parking design:** Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii and street intersections

**Site Grading-** Balancing Cut and Fill- measures to minimize impact of site grading- grade changes- site stabilization techniques- slope stability- retaining walls- erosion and sediment control

**Storm water management-** swales- detention and retention basins-

Gray water systems- sanitary sewers- on site sewage disposal systems-sewage treatment plants

**Exercise:** Preparation of parking area plan in a master plan, making dimension, turning radius for various vehicles, marking detail levels and incorporating storm water drainage solutions.

TOTAL HOURS: 60

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.

Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

<b>Semester: Fourth</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-43</b>	<b>BUILDING MATERIALS AND CONSTRUCTION III</b>	<b>2-0-1</b>	<b>3</b>	<b>2022</b>
<p><b>Course Objectives</b> The objectives of Building materials and construction III course for students of architecture include,</p> <ul style="list-style-type: none"> <li>• Understanding the fundamental principles of architectural construction.</li> <li>• Developing technical skills in the design and implementation of floor systems, roof systems, wall systems, and vertical transportation systems.</li> <li>• Familiarizing oneself with the various types of materials and systems used in construction, such as concrete, steel, wood, glass, and masonry, and learning how to select and combine them effectively to achieve the desired performance and appearance.</li> </ul>				
<p><b>Course Outcome</b> After the completion of this course, the students will be able to</p> <ul style="list-style-type: none"> <li>• Comprehend the application of various building components and their construction.</li> <li>• Understand the principles of structural engineering and learn about the different materials and methods used in construction and how to analyze and design structural systems.</li> <li>• Achieve proficiency in technical drawing and detailing.</li> </ul>				
<p><b>Text books</b></p> <ul style="list-style-type: none"> <li>• Arora S.P. and Bindra S.P., “Text book of Building Construction”, Dhanpat Rai &amp; Sons, NewDelhi, 2012.</li> <li>• P C Varghese, Building Construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2010</li> <li>• Francis D.K. Ching, Building Construction Illustrated John Wiley &amp; Sons 2000.</li> <li>• Balagopal T.S. Prabhu, “Civil Engineering Drawing Hand book”</li> </ul>				
<p><b>Reference Books</b></p> <ul style="list-style-type: none"> <li>• Don A. Watson Construction Materials and Processes McGraw Hill 1972. WB Mckay Building construction, Vol 1,2, Longman UK 1981.</li> <li>• Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999. RC Smith &amp; TL Honkala, ‘Principles and Practices of Light Construction’, Prentice Hall, Englewood Cliff, 1986.</li> <li>• Relevant BIS codes.</li> </ul>				
<p><b>MODULE I</b> <b>WALL SYSTEMS (15hrs)</b> Concrete System: Lintels and sunshades, concrete columns, concrete walls, concrete arches. Masonry System: Masonry walls unreinforced and reinforced, solid walls and cavitywalls, masonry columns and pilasters. Steel System: Structural steel framing, steel columns, light gauge steel studs, balloon framing. Wooden System: Wood stud framing, stud wall sheathing, wood columns, woodpost and beam framing. Partition wall systems. <i>Drawings: RCC lintel and sunshade with material specifications, Cavity wall details.</i></p>				

## **MODULE II**

### **FLOOR SYSTEMS (15 hrs.)**

Concrete floor system: One-way slab, One way joist slab, Two-way slab, Two-way slab and Beam.

Steel floor system: One-way beam system, Two-way beam system, Triple beam system, Semi rigid connections, Open- web steel joists, Metal decking, Light-gauge steel joists.

Wood floor system: Wood joists, Wood joist framing, wood beams supports and connections, plank and beam framing.

*Exercise : Site visits and field observations- concreting, steel structural framing  
: Beam and slab details with material specifications - one way slab, two way slab  
: RCC column detail*

## **MODULE III**

### **ROOF SYSTEMS (15hrs.)**

**Roof design** -Basic roof types: Flat roof, Sloping roof and Curved roof, deciding the slope or curvature of roof , roofing materials -thatching, tile roofing, G.I & Aluminium sheets ,FRP and RMP sheets ,green roofing, roof drainage systems.

**Roof framing and truss design** -Wood trusses: Different types of trusses, King post truss, Queen post truss, Howe truss , Fink truss, Pratt truss, Bowstring truss, North light truss.

Short span structures, Medium span structures ,Large span structures-Introduction to Space frames, Composite roof Systems, shell structures, folded plates.

*Drawings: Truss – King post truss, Queen post truss, Steel angular truss, roof covering and gutter details.*

## **MODULE IV**

### **VERTICAL TRANSPORTATION SYSTEMS (15 hrs)**

Planning of vertical transportation systems – design parameters.

**Ramps:** Planning of ramps, slope, finishes, safety precautions.

**Stairs:** Planning staircases - Standards, rules and regulations. Components of stairs, Support conditions like inclined slab, cranked slab, cantilever. Stair plans-stairs with straight, circular and curved flights. Construction details of Wood stair, fire escape stairs, Concrete stair, Steel stair and Composite stair.

**Elevators:** Planning and grouping of elevators,Elevator design parameters. Different types of elevators – passenger elevators, observation elevators, hospital elevators and freight elevators. Construction details – lift shaft, lift pit, machine room etc.

**Escalators:** Planning and details of escalators and travelators.

*Exercise: Analysis :Standards, rules & regulations of ramps, elevators, staircases, escalators from Kerala Building Rules and NBC.*

*Drawings : Wooden stair, RCC stair, Steel Stair, Composite stair..*

**TOTAL HOURS-60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments / Viva based on assignments	- 60 marks
Two internal tests each of equal weightage	- 30 marks
Attendance	- 10 marks

**UNIVERSITY EXAMINATION PATTERN**

- Q1 – 8 Short type questions of 5 marks, 2 from each module
- Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
- Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
- Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
- Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

<b>Semester: Fourth</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-S-P/D</b>	<b>Credits</b>	<b>Year of introduction</b>
<b>AR 22-44</b>	<b>THEORY OF STRUCTURES-III</b>	<b>2-1-0</b>	<b>3</b>	<b>2022</b>
<b>Course Objectives</b> The Theory of Structures III course for students of architecture would help them <ul style="list-style-type: none"> <li>• To understand torsion in shafts, structural behavior of columns and struts.</li> <li>• To understand the concept of indeterminate structures and the various methods of analysis of such structures.</li> </ul>				
<b>Course Outcome</b> After the completion of this course, the students will be able to <ul style="list-style-type: none"> <li>• Describe shear force, bending moment in beams and frames.</li> <li>• Achieve an understanding about various methods involved in analysis of indeterminate structures.</li> <li>• Discuss the way in which stress and strain impacts beams and columns.</li> </ul>				
<b>Text books</b> <ul style="list-style-type: none"> <li>• S.S Bhavikkatti, Strength of materials, New Age International Publishers</li> <li>• Rajasekharan S. and Sankarasubramanian G., Engineering Mechanics- Statics and Dynamics, Vikas Publications, New Delhi</li> <li>• R. K. Banzal., Engineering Mechanics, Lakshmi Publications Pvt. Ltd., New Delhi</li> <li>• R. K. Banzal., Strength of Materials, Lakshmi Publications Pvt. Ltd., New Delhi</li> <li>• Bhavikkatti S. S., Engineering Mechanics, New Age International Publishers</li> <li>• S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt Limited</li> </ul>				
<b>Reference Books</b> <ul style="list-style-type: none"> <li>• R Junarkar S. B. and Shah S. J., Mechanics of Structures (Vol. I), 30/e, Charotar Publishing House Pvt. Ltd., New Delhi, 2012</li> <li>• Junnarkar S. B. and H. J. Shah, Mechanics of Structures, Vol – II, 23/e, Charotar Publishing House, 2013.</li> <li>• Punmia B. C., A. K. Jain and A. K Jain, Theory of Structures (SMTS- II), Laxmi Publications Pvt. Ltd., 2004.</li> <li>• Ramamrutham S. And R. Narayan, Theory of Structures, Dhanpat Rai Publishing Co., 2012</li> <li>• M.M. Ratwani &amp; V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.</li> <li>• Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.</li> </ul>				
<b>MODULE I (12 hours)</b> <ul style="list-style-type: none"> <li>• Torsion of circular and hollow shafts, power transmission.</li> <li>• Axial loading of short strut, Long columns, Euler's formula, Rankine's formula,</li> </ul>				
<b>MODULE II (12 hours)</b> <ul style="list-style-type: none"> <li>• Determinate and Indeterminate beams.(Static Indeterminacy)</li> <li>• Consistent deformation method – fixed and propped cantilever , Shear Force Diagram Bending Moment Diagram</li> </ul>				



**MODULE III (14 hours)**

- Analysis of continuous beams using Three moment theorem Shear Force Diagram – Bending Moment Diagram, Support settlement case. (derivation not required)
- Introduction to slope deflection method-simple beams only (settlement case not required.)

**MODULE IV (10 hours)**

- Moment distribution methods – shear force and bending moment diagrams of beams (Simple cases) , shear force and bending moment diagrams of frames (Non-sway only.)

**TOTAL HOURS: 48**

**UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15marks from module I with choice to answer anyone.

Q III - 2 Questions of 15marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15marks from module III with choice to answer anyone.

<b>Semester: Fourth</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/S</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22 - 45</b>	<b>HISTORY OF ARCHITECTURE – III</b>	<b>3-0-0</b>	<b>3</b>	<b>2023</b>
<b>Course Objectives</b>				
<ul style="list-style-type: none"> <li>To provide awareness about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.</li> <li>To study the influences of events which have led to the outcome of styles such as Romanesque, Gothic &amp; Renaissance and their architects in Italy, France and Britain comprehending the rich vocabulary of forms &amp; shapes and structural systems.</li> </ul>				
<b>Course Outcome</b>				
After the completion of this course, the students will be able to				
<ul style="list-style-type: none"> <li>Acquire knowledge to identify the common characteristics among the monuments of a particular style.</li> <li>Ability to recognize the role of technology and material in development of structure, ornament &amp; detail, form &amp; iconography in architecture across different contexts.</li> </ul>				
<b>Reference Books</b>				
<ul style="list-style-type: none"> <li>Sir Banister Fletcher’s –“A History of Architecture”, Architectural Press, 1996.</li> <li>Louis Grodecki–“Gothic Architecture”, Rizzoli,1991 History of World Architecture (Series),</li> <li>Vols. Titled “Ancient Architecture, Primitive Architecture, Greek Architecture, Roman Architecture and Byzantine Architecture”, 1980.</li> <li>Kenneth Frampton : Modem Architecture -A Critical History “Builders of Ancient World”, A National Geographic Society Publication, 1986.</li> <li>Raeburn Michael, “Architecture of the Western World”, Popular Press, England, 1988.</li> <li>John Julius Norwich: Great Architecture of the World.</li> <li>Stephen Gardiner : Introduction to Architecture Monographs of Modem Architects.</li> <li>Henri Sterlin : Encyclopedias of World Architecture</li> </ul>				
<b>MODULE I ( 8 hours)</b>				
Introduction to society and culture of 400 -1150 AD in Europe;				
<b>Early Christian Architecture:</b> Evolution of Church form, surface treatment and materials of construction, Old St. Peters Basilica.				
<b>Byzantine Architecture:</b> Greek cross and Latin cross plans, Technique adopted to construct domes, surface treatment and material of construction. Pendentive sand Squinch arch construction, e.g., Hagia Sophia, St.Marks Venice.				
<b>MODULE II (10 Hours)</b>				
<b>Romanesque Architecture:</b> Design evolution - Development of Romanesque architecture from Early Christian architecture, Planning principles and structural details of Romanesque architecture.				
Types: Italian Romanesque architecture (Pisa Cathedral Complex), French Romanesque (Abbey-Aux-Hommes at Cane) British Romanesque (Durham’s Cathedral).				
<b>Module III (12 hours)</b>				
Introduction to society and culture of 1150 –1350 AD in Europe.				
<b>Gothic Architecture:</b> Evolution of structural systems in Gothic Architecture –pointed arches, ribbed vaults, flying buttress, pinnacles etc;				
<b>Types:</b> French Gothic Architecture (Notre Dame (Reims Cathedral), Paris) British Gothic Architecture (West Minister Abbey, Salisbury Cathedral) Italian Gothic Architecture (Milan Cathedral)				

**Module IV (12 hours)**

**Renaissance Architecture:** Introduction of different styles existed in renaissance period, to society and culture of 1400 -1800 AD. The Idea of rebirth and revival of Art, Architectural character during Renaissance period.

**Division of Renaissance architecture** into Early, Mature and Late periods. Structural contributions - Ribbed dome, Lantern dome.

Italian renaissance -St.Peters Rome, Florence Cathedral; Works of Brunelleschi, Alberti, Bramante and Michael Angelo;Palaces and Villas; Palladio's contribution – Villa Rotunda.

French renaissance: Palace of Louvres, Paris de Versailles.

British renaissance: St. Paul's Cathedral, London; White Hall Palace, London; Contributions of Inigo Jones and Christopher Wren.

TOTAL HOURS: 42

**UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III -2 Questions of 15 marks from module II with choice to answer anyone.

Q IV -2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

<b>Semester: Fourth</b>				
<b>Course No.</b>	<b>Course Name</b>	<b>L-T-P/D</b>	<b>Credits</b>	<b>Year of Introduction</b>
<b>AR 22-46</b>	<b>BUILDING SERVICES-II (LIGHTING &amp; ELECTRICAL SERVICES)</b>	<b>2-1-0</b>	<b>3</b>	<b>2022</b>
<b>Course Objectives</b> To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.				
<b>Course Outcome</b> After the completion of this course, the students will be able to <ul style="list-style-type: none"> <li>• Understand about the fundamentals of electrical services in buildings.</li> <li>• Acquire Knowledge about the Indian Electricity Rules.</li> <li>• Know about the present trends in lighting practices.</li> </ul>				
<b>Textbooks</b> <ul style="list-style-type: none"> <li>• Electrical Technology – H. Cotton</li> <li>• Electrical wiring, Estimating and Costing - L .Uppal</li> <li>• Electrical Wiring, Design and Estimation – Raina &amp; Bhattacharya</li> <li>• Electrical systems for Architects - Aly. S. Dadras</li> <li>• Simplified design of building lighting - Marc Schiler</li> <li>• National Electrical Code</li> <li>• Lighting Manual</li> </ul>				
<b>MODULE I (12 hours)</b> Introduction to electrical services, commonly used terminology. Supply and distribution of electricity to buildings – familiarization with Substations and components like High Tension and Low Tension Panels and switchgear, transformers, captive power plants – electrical system in multi storied commercial and industrial buildings, apartments, hospitals etc.				
<b>MODULE II (16 hours)</b> Distribution systems, underground and overhead - Cabling systems, surface and concealed wiring systems, PVC and metal conduits, casing and capping system. Panel boards, switches, distribution boards. Earthing systems and protective devices such as fuses, MCB's, MCCB's, ELCB's etc. –lightning protection - safety standards and IS codes. Introduction to Indian Electricity Rules. Exercise: Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos. Design of electrical layout for buildings of small scale through drawings.				
<b>MODULE III (16 hours)</b> Commonly used terminology in illumination – laws of illumination – measurement of luminous flux and lux meter. Ambient, task and accent lighting – direct and indirect luminary systems. Natural lighting – use of daylight – concept of day light factor. Atrium lighting – methods and uses. Energy efficient lighting system.				
<b>MODULE IV (16 Hours)</b> Sources of illumination – point source – row lighting, area illumination – evaluation of total flux – colouring				

aspects of lamps – linear and surface sources of illumination – common luminaries – incandescent, fluorescent/CFL, HID’s, MV, SV lamps etc. Criteria and standards for different purpose/activity illumination - flood lighting, functional buildings like hospitals, sports stadia, swimming pools and underwater luminaries – street lighting, commercial display lighting. Lighting simulation and performance analysis using software.

Exercise: Design exercise involving lighting design for appropriate projects of simple scale through choice, calculations, layout, drawings, simulations, physical models.

**Total Hours: 60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

**UNIVERSITY EXAMINATION PATTERN**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

**Semester: Fourth**

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AR 22-47	COMPUTER AIDED VISUALIZATION-II	0-0-3	3	2022

**Course Objective**

To equip the students to acquire enough skills in Autodesk Revit and to gain confidence in them for using digital media for preparation of drawings and 3D views.

**Course Outcome**

After the completion of this course, the students will be able to

- Prepare all necessary drawings for a project using software along with 3D views.

**Reference Books**

- Revit Manual
- Autodesk Revit for Architecture Certified User Exam Preparation (Revit 2024 Edition)

**MODULE 1**

- Introduction to Autodesk Revit Architecture
- Starting an Architectural Project
- Navigation Tools, Configuring Global Settings, Creating Walls, Creating Architectural Walls
- Using Basic Building Components-I-Adding Doors, Adding Windows and Wall Openings
- Using the Editing Tools, Working with Selection Sets
- Editing Tools - Grouping Elements, Retrieving Information About Elements
- Working with Datum Planes and Creating Standard Views, Working with Levels, Working with Grids, Working with Reference Planes and Work Planes, Controlling the Display of Elements, Working with Project Views
- Using Basic Building Components-II - Creating Floors, Creating Roofs, Shape Editing Tools, Creating Ceilings, Adding Rooms
- Using Basic Building Components-III -Working with Components, Adding Stairs, Adding Railings and Ramps, Creating Curtain Walls
- Adding Site Features- Working with Site Features, Property Lines and Building Pads, Adding Site Components
- Using Massing Tools- Understanding Massing Concepts, Creating Massing Geometry in the Family Editor, Editing Massing Geometry in the Family Editor, Massing in the Conceptual Design Environment, Creating Massing Geometry in a Project, Creating Building Elements from Massing Geometry, Creating Families
- Adding Annotations and Dimensions -Adding Tags, Room Tags, Keynotes, Adding Symbols and Dimensions, Dimensioning Terminology and Dimensioning Tools, Adding Alternate Dimension Units and Spot Dimensions
- Creating Project Details and Schedules- Project Detailing in Autodesk Revit Architecture, Crop Regions, Fills Patterns, and Detail Components, Adding Text Notes, Creating Drafting Views, Revision Clouds, Working with Schedules



- Creating Drawing Sheets, and Plotting, Creating Drawing Sheets, Creating Duplicate Dependent Views, Printing in Revit Architecture
- Creating 3D Views- Three Dimensional (3D) Views, Dynamically Viewing Models with Navigation Tools, orienting a 3D View, Generating Perspective Views, Using a Section Box
- Rendering Views and Creating Walkthroughs- Rendering in Revit Architecture, Working with Materials, Lights, Decals and Entourage, Rendering Settings o Creating a Walkthrough, Autodesk 360 | Rendering

**PROJECTS**

- To make all the drawing for a chosen building type (apartment, commercial building etc.) which has minimum 4 floors.
- Preparing complete set of drawing for a building including all floor plans, sections, sectional views, details, 3D views, and walkthrough

**TOTAL HOURS: 60**

**CONTINUOUS INTERNAL EVALUATION PATTERN:**

- |   |            |
|---|------------|
| • Demonstrations / Presentations / Drawings (Course work) | - 50 marks |
| • Records / Portfolio                                     | - 20 marks |
| • Final test / Viva                                       | - 20 marks |
| • Attendance  | - 10 marks |